

THE AUSTRALIAN NATIONAL UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF ZOOLOGY
ANNUAL REPORT 1981

GENERAL

This year has been an extremely difficult one for the Department of Zoology; the retirement of Professor Barnett at the beginning of the year from the Headship of the Department having come at a time of severe budgetary restraint. Budgetary restraint, with its inevitable reduction in the numbers of general staff, academic staff and household expenses, has forced the Department to reappraise its policies and procedures. To do so, while the position of Head of Department is a temporary appointment, of uncertain duration, makes the forward planning really required extremely difficult. An Electoral Committee met early in the year to consider numerous replies to the University's advertisement of the Chair of Zoology, and the Department had hoped that a new appointment might be made by the middle of the year. As things have turned out, no final decision has been made on filling the Chair of Zoology, and considerable uncertainty remains among all members of staff as to the future direction of the Department. It must be hoped that a decision on the Chair will be made in the coming year.

The Department has considered very carefully the report of the Committee set up to review the Department immediately prior to Professor Barnett's retirement. Implementation of the Review Committee's recommendations is complicated by changes in the University's policies following the increasingly stringent budgetary constraints placed on the University. To a degree, the Committee's recommendations, made before the present position was known, conflict with advice given by the Vice Chancellor on some aspects of University policy. For example, the Review Committee recommended the establishment of an interdisciplinary course on Evolution, while the Vice Chancellor has advised the Faculties that we should consider a reduction in the number of course options opened to students with a view to economising the costs/student. Similarly, the Review Committee recommended some increases in demonstrating for one First Year unit, when the Department must consider reducing the number of tutors and demonstrators. Recommendations that the Department should devote more of its resources to the teaching of field work in zoology would clearly place significant strains on the cost/student. Nonetheless, by considering the spirit of the Review Committee's Report, steps have been taken to implement the Review Committee's suggestions as fully as it lies within our present means.

Dr Bryant, on behalf of the Department, entered into discussions with the Departments of Biochemistry, Botany, Geology, Forestry, Psychology, Prehistory and Anthropology with a view to introducing an interdisciplinary course on the 'Theory of Evolution'. Support for such a course was found in the departments of Botany, Geology and Prehistory and Anthropology, but under present conditions, it would seem inopportune to bring forward a recommendation for yet another optional Third Year unit. Moreover, all the departments concerned are facing staff reductions and budgetary restraints, and under these circumstances, the Department has not felt prepared to recommend to Faculty the introduction of such a unit. Instead, the Department of Zoology has taken steps to introduce the 'Theory of Evolution' more formally in each of its units from First Year, through to the Honours Year, and will attempt to consider the theory from an interdisciplinary rather than purely zoological standpoint.

The Department has reviewed the number of second year units offered so as to encourage students specialising in zoology to take appropriate units from courses offered by other departments in The Faculty, especially courses in genetics. Of the two first year units offered by the Department, Zoology A01 has for a number of years broken with the traditional method of teaching through formal lectures and formal practicals. In place of this, much of the work centres round audio tapes which are intended to integrate theory with practical work and to give some measure of self-paced learning to the students. As originally envisaged, formal lectures would be dispensed with, but an extensive system of tutorials would complement the audio and practical classes. For several years the Department has carefully considered the advice of students on the success of this method of teaching, through discussion and the filling in of questionnaires. There has been a consistent demand for the inclusion of formal lectures in the course, and this is now a regular supplementary feature of the course. Tutorials, which are voluntary, have never retained the consistent attendance of more than a minority of the students enrolled in the course, but have been enthusiastically received by this minority. It has become apparent that there are wide differences in the success with which members of the teaching staff conduct tutorial classes. The Department has taken steps to further strengthen this course, and to ensure that the students meet a wider range of the academic staff during the course of the year than has been the case in the past. It is believed that the academic standards of the course have been raised, while retaining gratifyingly small failure rates and premature withdrawals. The Department will continue to monitor very carefully this course with a view to its continued improvement.

The second first year unit, Human Biology A02, has in the past been taught in collaboration with the Department of Psychology. In future, Psychology and Zoology will no longer collaborate formally in this course, but instead, the Department of Zoology will collaborate with the Department of Prehistory and Anthropology in putting on this course. The loss of one senior tutors position will certainly complicate the teaching of Human Biology.

The Department has been seriously concerned during the year with improving the standard of care of laboratory animals. Since funds are not available for the reconstruction of animal holding facilities in H Block (as recommended by the Review Committee), the Department has progressively closed down the maintenance of any animals in H Block, where conditions are not satisfactory. The existing Zoology Animal House comprises two sections built at different times. The more recent has a high standard, and the Department has offered facilities to other departments in The Faculty, whose facilities for maintaining animals at acceptable standards have proved unsatisfactory. The Department has hopes and plans at an advanced stage for modernising the older part of the Animal House. The Department fully accepts that the maintenance of animals will require a much greater degree of co-operation between Schools and Departments of The Faculties than has happened in the past. The Department has also been reappraising its methods for reviewing the maintenance of animals and the conduct of experiments so as to satisfy proper standards of animal welfare. A great deal of time and administrative effort has been spent in 1981 on planning animal house facilities and on animal welfare considerations. The loss of several general staff positions has complicated the provision of acceptable standards of animal care.

LIAISON WITH SCHOOLS

Dr Janssens organised a successful evening meeting with Science Teachers from the ACT and surrounding areas of NSW. Some teachers came from as far away as Yass and Cooma, but not all schools in the ACT were represented. It transpired that the invitation sent by the Department to Principals of some of the School and Colleges, was not always passed on to their Science Teachers direct. The meeting was most informative for both teachers and academic staff of the Department and we propose to follow-up this seminar in the coming year. The Department was asked to put on some in-service courses for teachers to bring them up-to-date with modern advances in biology. Some of their concerns would be better met by the RSBS, but the Department will consider putting on short courses in some areas, which lies within our competence.

LIAISON WITH RSBS

The Department has been extremely grateful for substantial assistance with the teaching of entomology by members of RSBS. We have also had extremely valuable assistance with several honours students with their courses. We acknowledge the useful work done for several members of the Department by the University's electronmicroscope unit housed in the Research School, and the provision of facilities for members of the Department carrying out their own work in that unit. The Department must now consider how to dispose of its obsolete and non-functional instrument.

RESEARCH

With Professor Barnett's retirement, there has been a progressive reduction in the research by the Department on animal behaviour, as Professor Barnett's postgraduate students progressively complete their degrees, and Professor Barnett continues active work as an Emeritus Professor elsewhere in the University. The loss of an extremely active field of research in the Department, associated with Professor Barnett's own work, will be sorely missed.

Parasitology is now the major field of research in the Department, involving three members of the academic staff and eight postgraduate scholars, one Research Fellow and two Research Assistants. The Department's work has been most generously supported by the Australian Wool Corporation and the Rural Credit Development Fund (details of which are set out later in the Report). Under Dr Bryant's leadership, research is being pursued into fundamental studies of the biochemical adaptation of helminth parasites to their environment, as well as on the mode of action of anthelmintics (by D. Larkman, E. Bennett and H. Kane); with particular emphasis being given to several helminths of economic importance in Australia (*Haemonchus contortus* and *Fasciola hepatica*). Dr Bryant and C. Budge have also collaborated with Dr Clark (JCSMR) in work on malaria. Dr Bryant's work has been considerably aided by the purchase of a high-performance liquid chromatography instrument with funds allocated by the Boardman Committee of the University.

Dr Howell has concentrated on the inter-action between the liver fluke (*Fasciola hepatica*) and its host. Considerable progress has been made towards biosynthetically labelling liver fluke antigens and identifying nuclei acid sequences with code for them by one of Dr Howell's students (D. Irving). Dr Howell is also supervising some work on malaria (by P. Lewis-Hughes) in mice and, in addition to a full teaching load, has served as sub-Dean of the Faculty of Science.

Dr Nicholas is studying the immunoparasitology of the dog roundworm *Toxocara canis*, which is a public health problem because people infected by this dog parasite may lose their sight and suffer other abnormalities. Collaboration with the Commonwealth Institute of Health (Mr Walker and Dr Torpe) is in progress to provide an immunodiagnostic service for Australia (until now sera for testing have had to be sent to the United Kingdom). Monoclonal antibodies raised against this parasite in mice, in collaboration with Dr Graham Mitchell of the Walter & Eliza Hall Institute, will be of use in immunodiagnostic work and in fundamental studies on the immunoparasitology of this parasite. Postgraduate studies under Dr Nicholas' supervision are progressing on the immunoparasitology of cestodes and the genetics of drug resistance in nematodes (A. Barton and E. Washington).

Research in entomology is carried out by two members of the Department. Dr Short is supervising work by six postgraduate students in collaboration with research workers in CSIRO on Applied Entomology, as well as continuing his major taxonomic work

on Australian Hymenoptera; which is of world wide significance. Studies of Applied Entomology have been concerned with the potato tuber worm moth (M. Tóth); the cabbage butterfly (P. Sampson); the ecology of apple mites (G. van de Klashorst); the ecology of insect communities on lucerne and grasslands (D. Crawford) and the biological control of aphids (S. Liu). Dr Gullan has been working with the National Insect Collection (CSIRO) on coccids, and has begun work in the taxonomy of species infesting sugar cane in Queensland.

The structure and function of the adrenal gland in marsupials is being studied by Dr Janssens, who this year has been studying the effect of hormones in the tamar wallaby and in collaboration with Mr Call, Dr Danckwerts and Dr Tindale-Biscoe (CSIRO - Division of Wildlife), the adrenal gland of the brush tail possum. Dr Janssens is supervising work by a postgraduate student (G. Wilkes) on the development of renal function in marsupials; and the role of prolactin and progesterone in seasonal reproduction of mammals (L. Hinds); and an honours student (A. Caine) on the role of hormones in regulating carbohydrate metabolism in the amphibian liver. The Department has been fortunate to have Professor W. Hanke from the University of Karlsruhe as a Faculty Visitor to work with Dr Janssens for nearly three months.

The ecology of small mammals in the Kosciusko National Park and the adjacent regions of NSW is being actively pursued by Dr Happold and several postgraduate students (P. Carron, C. Dickman, K. Green and D. King). Population studies and special features of alpine environments have been important aspects of this work. Other students under Dr Happold's supervision have been completing work on the social organisation of the Quoll in Tasmania (J. Godsell) and, in collaboration with workers in CSIRO, on the food and reproduction of the house mouse in irrigated crops near Griffith, NSW (M. Bomford).

Dr Barwick is supervising work by two postgraduate students (S. Inwards and W. Phillips) on the physiology of bats; Mr Tidemann is also involved in research on bats (supervised by Professor Barnett). Dr Barwick is working on the ecology of reptiles and collaborating with Dr Campbell (Department of Geology) on the palaeontology of lungfishes.

Other work in the Department has been on the social signals of wild rats by Dr Marples, who has also collaborated with a previous student in the Department (T.J. Shorthouse) in writing up work which was undertaken under his supervision on the ecology of scorpions. Dr Horn has been working with members of JCSMR on 'inflammation and platelet disease in laboratory rats'. Dr Harris is supervising postgraduate work on the effects of cadmium pollution on freshwater fish (M. Maliel) and on the biology of marine and freshwater arthropods (P. Berents, S. Roberts and H. Whitton). Dr Harris' own interests are the taxonomy of Australian Copepods. Dr Happold has continued his studies on the distribution and taxonomy of Nigerian mammals.

COLLABORATION WITH OTHER INSTITUTIONS

CSIRO - Division of Wildlife Research: Research on marsupial endocrinology - P.A. Janssens and L. Hinds.

: Mouse populations in the Riverina - D.C.D. Happold and M. Bomford.

- Division of Entomology: National Insect Collection
- P.J. Gullan

: Applied entomology and arachnology - J.R.T. Short

Commonwealth Institute of Health: Immunodiagnosis - W.L. Nicholas

Walter & Eliza Hall Institute of Medical Research: Immunodiagnosis
- W.L. Nicholas

RESEARCH GRANTS

Australian Wool Corporation Grants to C. Bryant, M.J. Howell and W.L. Nicholas

Rural Credits Development Fund to C. Bryant

ARGC to P.A. Janssens

National Health & Medical Research Council to C. Bryant

Roche Maag Limited to C. Bryant

ABRS to V.A.P. Harris

OVERSEAS VISITING SCIENTIST

The Department has been fortunate in the brief visit of Professor Hanke from the University of Karlsruhe as a Visiting Faculty Fellow. In a situation where Universities are not recruiting new staff, it is valuable to have the stimulus of visiting scientists in the Department, and particularly when they are from overseas institutions. Professor Hanke and Dr Janssens have collaborated in work on studies of hormone regulation of metabolism in amphibia and lungfish.

ATTENDANCE AT OVERSEAS CONFERENCES

Dr D.C.D. Happold read two papers at the 3rd International Colloquium on the Ecology and Taxonomy of African Small Mammals at the University of Antwerp.

Dr P.A. Janssens delivered a paper at the 9th International Symposium on Comparative Endocrinology in Hong Kong in December.

OTHER ACTIVITIES

Mr A.A. Argyle - Technical Services Manager is Chairman and Treasurer of the Federal Executive of the Australian Institute of Science and Technology;

Dr C. Bryant is President-elect of the Australian Society for Parasitologists;

Dr R.E. Barwick is Chairman of the Management Committee, Edith and Joy London Foundation (Kioloa);

Dr M.J. Howell is sub-Dean, Faculty of Science

DEPARTMENTAL COMMITTEE

Departmental meetings were held three times during the year and at the first one, we established two sub-committees, (1) a Management Committee to deal with academic, budgetary and housekeeping matters, and staff matters, which met fortnightly, and on which teaching staff, students and general staff were represented; (2) an Education Committee, on which teaching staff met with representatives from undergraduate students, but this committee met only once due to lack of sufficient business.

HIGHER DEGREES

E.M. Bennett received the degree of PhD for a thesis entitled 'Biological studies on the nature of benzimidazole resistance in *Haemonchus contortus* (Rudolphi 1830)'.

M. Tóth received the degree of MSc for a thesis entitled 'Role of pheromones in sexual communication in the potato tuberworm moth, *Phthorimaea operculella* (Zell.) (Lepidopera: Geliehiidae).

P.R. Sampson received the degree of PhD for a thesis entitled: 'Evaluating crop losses caused by insects: a systems study of the effects of *Pieris rapae* on cabbage'.

STAFF

Head of Department & Reader

W.L. Nicholas, BSc, PhD (Liv.)

Readers

C. Bryant, MSc, PhD (Lond.)

J.R.T. Short, BSc (WA), D.Phil (Oxon), DSc (Aberd.)

Senior Lecturers

R.E. Barwick, MSc (NZ), PhD (ANU)

D.C.D. Happold, MA (Camb.), PhD (Alta)

V.A.P. Harris, BSc, PhD (Lond.)

M.J. Howell, BSc (NZ), MSc (Well.), PhD (ANU)

P.A. Janssens, BSc, PhD (Sheff.)

T.G. Marples, MSc (NZ), PhD
(Georgia)

Senior Tutors

L.S. Danckwerts, BSc (Syd.), PhD
(NSW)

P.L. Horn, BS, DVM (Mich. State),
PhD (Calif.)

S.C. Tidemann, BSc (Adel.), DipT
MSc (ANU)

Tutor

P.J. Gullan, BSc PhD (Monash)

Visiting Fellow

R.A. Chevis (Roche-Maag), BVSc.

R. Cornish, BSc PhD (ANU)

Research Assistants

C. Behm, BSc(Hons), PhD (ANU)

A. Stewart, BSc, MSc (Chulalongkorn),
PhD (New Hampshire)

PUBLICATIONS

- ARGYLE, A.A. 1981
Handbook of Science and Technology. Published by Australian Institute of Science Technology.
- *BAILEY, P.C.E. 1981
 Insect drift in Condor Creek, Australian Capital territory. *Aust. J. Mar. Freshwater Res.* 32, 111-120.
- *BAILEY, P.C.E. 1981
 Diel activity in nymphs of an Australian mayfly, *Atalophlebioides* sp. (Ephemeroptera: Leptophlebiidae). *Aust. J. Mar. Freshwater Res.* 32, 121-131.
- BARNETT, S.A.* & BROWN, V.A.* 1981
 Pull and push in educational innovation: study of an interfaculty programme. *Studies in Higher Education* 6, 13-22.
- BARNETT, S.A.* & FOSTER, K.A.* 1981
 Cold-adaptation and the parent-young interactions of wild mouse mice, *Mus musculus*. *Physiology and Behaviour* 26, 839-843.
- BARNETT, S.A.* & HOCKING, W.E. 1981
 Are nests built for fun? Effects of alternative activities on nest-building by wild house mice. *Behavioural and Neural Biology* 31, 73-81.
- BARNETT, S.A.* & MARPLES, T.G. 1981
 The "threat posture" of wild rats: a social signal or an anthropomorphic assumption? In: *Multidisciplinary Approaches to Aggression Research* (eds. P.F. Brain and D. Benton), Elsevier/North Holland Biomedical Press.
- STEWART, A.P.* & BARNETT, S.A.* 1981
 Seasonal influences on the movements of bush rats, *Rattus fuscipes*, in an artificial environment. *Aust. J. Zool.*, 29, 41-48.
- DICKMAN, C.R. 1981
 Estimation of population density of the common shrew, *Sorex araneus*. *Journal of Zoology, London*, 192, 550-552.
- DICKMAN, C.R. 1981
 Ecological studies of *Antechinus stuartii* *Antechinus flavipes* (Marsupialia, Dasyuridae) in open-forest and woodland habitats. *Australian Zoologist* 20, 433-446.
- GREEN, K. & OSBORNE, W.S.[†] 1981
 The diet of foxes, *Vulpes vulpes* (L.), in relation to abundance of prey above the winter snowline. *Australian Wildlife Research* 8, 349-360.

*Former member

†Not a member of this University

- HORN, P.L.* , LAVER, J.J.* & WOOD, J.T.[†] 1981
Changes of ageing parameters among rats on diets differing in fat quantity and quality. *J. Gerontology* 36, 285-293.
- HORN, P.L.* , WOOD, J.T.[†] & LAVER, J.J. 1981
Ageing changes in Porton rats with spontaneously arising pituitary tumours. *Exper. Geront.* 16, 141-147.
- HOWELL, M.J. 1981
An approach to the production of helminth antigens *in vitro*: the formation of hybrid cells between *Fasciola hepatica* and a rat fibroblast cell line. *Int. J. Parasitol.* 11, 235-242.
- JANSSENS, P.A. 1981
Hepatic glycogen metabolism and its regulation by hormones in pouch young of the tamar wallaby, *Macropus eugenii*. *Gen. comp. Endocr.* 44, 497-507.
- JANSSENS, P.A. 1981
Metabolic changes associated with the switch from a milk to a vegetable diet in the tamar wallaby, *Macropus eugenii*. *Comp. Biochem. Physiol.* 708, 105-113.
- JANSSENS, P.A. 1981
Long-term effects of corticosteroid administration in the tamar wallaby, *Macropus eugenii*. *Gen. comp. Endocr.* 45, 56-60.
- KING, D.H. 1981
Spatial separation and avoidance of open space by *Antechinus stuartii*. *Bulletin, Australian Mammal Society* 7, 45.
- NICHOLAS, W.L. & STEWART, A.C. 1981
Extraction of nematodes from soil and marine mud. *Australian Nematologists' Newsletter* 1, 8-12.
- OVINGTON, K.S.* & BRYANT, C. 1981
The role of carbon dioxide in the formation of end-products by *Hymenolepis diminuta*. *Int. J. Parasitol.* 11, 221-228.
- RAJASEKARIAH, G.R.* & HOWELL, M.J. 1981
Age-associated responses in susceptible and resistance rats to infection with *Fasciola hepatica*. *Int. J. Parasitol.* 11, 59-65.
- SANDEMAN, R.M.* & HOWELL, M.J. 1981a
Studies of the response of sheep to challenge infection with *Fasciola hepatica*. *Research in Veterinary Science* 30, 154-158.

*Former member

[†]Not a member of this University

SANDEMAN, R.M.* & HOWELL, M.J. 1981b

Precipitating antibodies against excretory/
secretory antigens of *Fasciola hepatica* in
sheep serum. *Veterinary Parasitology* 9, 35-46.

SHORT, J.R.T. 1981

The final instar larvae of three Porizontinae
(Hymenoptera : Ichneumonidae) from India. *Oriental
Insects* 15, 175-178.

*Former member

THE AUSTRALIAN NATIONAL UNIVERSITY
DEPARTMENT OF ZOOLOGY ANALYSIS OF STUDENT PERFORMANCE

1 Subject or unit	Percentage of Number Enrolled								Percentage of Number Sitting													
	2		3		4		5		6		7		8		9		10		11		12	
	Enrolled as at 30.4.81		Sitting		Wastage (ie. 2.3)		Failure		Sitting		High Distinction		Distinction		Credit		Pass with Merit		Pass		Fail	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Human																						
Biology AO2	65	100	55	85	10	15	5	8	55	100	-	-	2	4	22	40	-	-	26	47	5	9
Zoology AO1	96	100	79	82	17	18	7	7	79	100	1	1	6	8	19	24	-	-	46	58	7	9
Zoology BO2	25	100	24	96	1	4	2	8	24	100	1	4	2	8	9	38	-	-	10	42	2	8
Zoology BO3	39	100	38	97	1	3	1	3	38	100	1	3	3	8	21	55	-	-	12	31	1	3
Zoology BO8	28	100	27	96	1	4	3	11	27	100	1	4	2	7	9	33	-	-	12	45	3	11
Zoology BO9	32	100	30	94	2	6	2	6	30	100	-	-	5	17	3	10	-	-	20	67	2	6
Zoology CO1	14	100	12	86	2	14	-	-	12	100	-	-	3	25	5	42	-	-	4	33	-	-
Zoology CO5	20	100	20	100	-	-	2	10	20	100	1	5	3	15	4	20	-	-	10	50	2	10
Zoology CO6	25	100	25	100	-	-	1	4	25	100	-	-	1	4	14	56	-	-	9	36	1	4
Zoology CO8	25	100	25	100	-	-	-	-	25	100	3	12	3	12	3	12	-	-	16	64	-	-
Zoology C10	20	100	19	95	1	5	1	5	19	100	-	-	5	26	6	32	-	-	7	37	1	5
Zoology C11	21	100	20	95	1	5	-	-	20	100	4	20	2	10	10	50	-	-	4	20	-	-
Final Honours	6	100	5	83	1	17	-	-	5	100	1 - H1; 3 - H2A; 1 - H2B; 1 withdrew											
Graduate Dip.	2	enrolled																				
Masters Degree	5	enrolled - 1 admitted to the degree																				
PhD	33	enrolled - 2 admitted to the degree; 2 withdrawals																				