



**ASSAB '86**

# Programme & Abstracts

MASSEY UNIVERSITY, PALMERSTON NORTH, NEW ZEALAND  
28-31 January 1986

**AUSTRALIAN SOCIETY FOR THE STUDY OF ANIMAL BEHAVIOUR**

**THIRTEENTH ANNUAL CONFERENCE**

**28-31 JANUARY, 1986**

**MASSEY UNIVERSITY, PALMERSTON NORTH, N.Z.**

**VENUES**

<b>Accommodation</b>	- Kairanga Court (on campus)
<b>Registration</b>	- foyer of Ag/Hort lecture block
<b>Oral presentations</b>	- Lecture theatre 4 in Ag/Hort block
<b>Posters</b>	- foyer of Ag/Hort lecture block
<b>Morning/Afternoon tea</b>	- foyer of Ag/Hort lecture block
<b>Lunch</b>	- Dining room of Student Association Building
<b>Botany &amp; Zoology Reception</b>	- Kiwitea Lounge, Student Association Building
<b>Excursion departures</b>	- Road in front of Rotary Court
<b>Videos and vegemite</b>	- Ag/Hort lecture block
<b>A.G.M.</b>	- Lecture theatre 4 in Ag/Hort lecture block
<b>Conference dinner</b>	- Wharerata Homestead (on campus)

PROGRAMME

Tuesday 28 January

CHAIR: Ed Minot

**BEHAVIOUR AND SPECIATION**

9.00 R Gray (Univ. Auckland) and R Craw (DSIR Entomology)  
Darwinian and anti-Darwinian views of species.

9.30 R Moorhouse (Univ. Auckland) E.P.H.D  
Non-conformism in a parrot : the "lekstraordinary" kakapo.

10.00 MORNING TEA

CHAIR: Christian Peeters

10.30 M Wells (Univ. Canterbury)  
Inter-male contest structure in a New Zealand salticid spider  
Euophrys parvula (Aranae : Salticidae)

10.50 P Smith (CSIRO Entomology, Canberra)  
Male advantage/female advantage in the mating system of  
Lucilia cuprina.

11.10 L Barton Browne (CSIRO Entomology, Canberra)  
Relationship between mated status and stage of ovarian development  
in females of the sheep blowfly, Lucilia cuprina, in the field.

11.30 M McIntyre (Victoria Univ., Wellington)  
Spatial interactions of two bush-dwelling cockroach species.

12.00 LUNCH

CHAIR: Ian McLean

1.15 C Reed (Massey Univ., Palmerston North)  
Captive management of black stilts.

1.35 R Coulson, G Coulson and W Wakefield (Univ. Tasmania).  
Breeding behaviour of Kelp Gulls and Pacific Gulls in south-eastern  
Tasmania.

1.55 A Lill (Monash Univ., Melbourne)  
Winter energetic strategies of birds in temperate wet forests in Australia.

2.15 J Craig (Univ. Auckland)  
Foraging behaviour of honeyeaters and the pollination of flax

2.35 G Coulson (Univ. Melbourne)  
The role of habitat structure as a determinant of grouping in the  
Western Grey Kangaroo, Macropus fuliginosus

3.00 AFTERNOON TEA

**SCIENTISTS AND THE GOVERNMENT**

- 3.30 C Veltman (President, ASSAB)  
Will FASTS slow ASSAB down?
- 3.40 R Sadleir (Director, DSIR Ecology Div.)  
Scientific input to decision-making from within the public service.
- 4.00 G Gregory (Councillor, N.Z. Association of Scientists)  
Scientists as lobbyists.

4.30 Dr N Waters, University Vice Chancellor  
Welcome to Delegates

4.30 - 6.00 BOTANY AND ZOOLOGY DEPARTMENT RECEPTION

**Wednesday 29 January**

**BY DAY :** Excursions to Kapiti Island, Mt. Bruce National Wildlife Centre and around the Massey farms. Details in your conference satchel or from the registration desk.

**BY NIGHT :** A selection of scientific and feature films, from 8 'til late. Vegemite sandwiches for supper!

**Thursday 30 January**

**CHAIR: Peter O'Brien**

- 9.00 K Clapperton (Massey Univ., Palmerston North)  
Development and testing of mustelid scent lures.
- 9.20 R Kilgour (Ruakura Animal Research Station, Hamilton)  
The response of grazing cattle to pasture contaminated with possum (Trichosurus vulpecula) excreta.
- 9.40 S T Coats and R G Beilharz (Univ. Melbourne)  
Which senses do cattle use to determine whether an electric wire is pulsed?
- 10.00 A Hargreaves and G Hutson (Univ. Melbourne)  
Some responses of sheep to husbandry procedures.
- 10.20 **MORNING TEA** **CHAIR: Robert Holmes**
- 10.50 J Blackshaw, A Blackshaw, and T Kusano (Univ. Queensland)  
Cattle behaviour in a saleyard.
- 11.10 C Petherick, D Boderio and J Blackshaw (Univ. Queensland)  
The effect of feeding regime on agonistic interactions in group-housed sows.

- 11.30 J Blackshaw (University of Queensland) and D. Allan  
(Queensland Institute of Technology)  
Welfare and behavioural problems in domestic animals : a systematic  
approach.
- 12.00 LUNCH CHAIR: Lloyd Davis
- 1.00 Poster-paper authors available near their presentations.
- 1.30 I Jamieson and J Craig (Univ. Auckland)  
A critique of helping behaviour in birds: departure from functional  
explanations.
- 1.55 S Farabaugh and E Brown (Univ. Maryland, USA and Massey University)  
Song repertoires in group-living Australian magpies (Gymnorhina tibicen)
- 2.15 Ch. Peeters (Univ. N.S.W.)  
The division of labour in a queenless ant species, Rhytidoponera sp. 12
- 2.35 L Davis (Otago Univ., Dunedin)  
Fidelity and reproductive success in Adelie Penguins.
- 3.00 AFTERNOON TEA CHAIR: John Craig
- 3.30 E Minot (Massey Univ., Palmerston North)  
Ontogeny of the phototactic response in starlings (Sturnus vulgaris)
- 3.50 M Cullen and C Haase-Suchau (Monash Univ., Melbourne)  
How do schooling fish maintain position?
- 4.15 A.G.M. of Australian Society for the Study of Animal Behaviour
- 6.00 CONFERENCE DINNER

\*\*\*\*\*

**Darwinian and anti-Darwinian Views of Species**

The nature of the Darwinian revolution is discussed in relation to current species definitions. Imanishi's concept of 'species identity' and Paterson's "Specific Mate Recognition System" (SMRS) view of species are argued to be unproductive returns to essentialist pre-Darwinian views. An alternative view of species as individuals is shown to be more in line with modern thinking on the variability, flexibility and context dependent nature of behaviour.

\*Department of Zoology,  
University of Auckland,  
Auckland,  
New Zealand.

\*\*Entomology Division,  
DSIR,  
Private Bag,  
Auckland,  
New Zealand.

**Non-Conformism in a Parrot: The "Lekstraordinary" Kakapo**

The kakapo (Strigops habroptilus Gray, 1845) is distinctly unusual among parrots. The largest parrot in the world by weight, flightless, nocturnal, solitary, and the only parrot with a lek mating system, the kakapo can only be regarded as aberrant in an otherwise homogeneous order. Understanding the ecology of kakapo would consequently be expected to be difficult from a phylogenetic perspective. Lek mating may, however, provide the context within which a more coherent view of kakapo ecology may be obtained. Lek species are sparsely scattered through a diverse range of taxa, from insects to fish, bats and antelope. The independent occurrence of lek mating in such a diverse group of organisms suggests that it may have an ecological basis.

Much of the current literature on the evolution of lek mating stresses the relative fitness consequences for males and females of male aggregation. Male aggregation is generally regarded as the lek phenomenon, with the resultant assumption that there is a universal "cause" of male aggregation in lek species, and that the continuum of male dispersal in species with lek-like mating systems represents an evolutionary continuum. This approach appears to consider selection in an ecological vacuum, and has resulted in overlooking possible ecological generalities between lek species. An ecological approach to lek mating is proposed as an alternative to this view. The ecology of kakapo on Little Barrier Island was found to be more consistent with this ecological approach to lek behaviour, and a case is made for the greater generality of this approach.

The "non-conformism" of kakapo, is of interest not only to current theory on lek evolution, but also to orthodox views of adaptation and the relationship of phylogeny and ecology in evolution.

Department of Zoology,  
University of Auckland,  
Auckland,  
New Zealand.

**Inter-male Contest Structure in a New Zealand Salticid Spider  
Euophrys parvula (Araneae: Salticidae)**

Inter-male aggressive behaviour and contest structure in a New Zealand salticid spider Euophrys parvula (Araneae: Salticidae) was investigated using induced encounters in the laboratory. Males have five distinctive and highly stereotyped aggressive displays in addition to escalated fighting. These were ranked in a subjectively determined order of increasing 'cost' (in terms of energy expenditure and risk of injury). Contests began with low ranked displays and proceeded in a stepwise fashion through displays of higher rank until one spider retreated. The highest ranked display in any given contest was termed the 'level of escalation' of that contest and is assumed to be some measure of contest cost. The larger spider was the winner in 80% of 29 induced encounters observed in the laboratory. Contest level of escalation was found to be negatively correlated with the difference in body size of the two opponents. The effect of a 'resource' (a dead female E. parvula which males would readily court and mate with) on contest structure was investigated. Contests were found to escalate to higher levels in the presence of the resource. These results are in accord with predictions of simple 'game-theoretic' models of contest structure.

Department of Zoology,  
University of Canterbury,  
Christchurch,  
New Zealand.

**Male Advantage/Female Advantage in the Mating System of Lucilia cuprina**

The variety of mating systems in insects is remarkable. The causes of this diversity have been illuminated recently in such treatises as Thornhill and Alcock (1983) by evolutionary theorising in which the existing mating system is viewed as the product of competition between male and female individuals with quite different priorities.

We set out to assess the physiological control of mating behaviour in Lucilia cuprina in terms of male and female advantage.

Within the first two minutes of an 11 minute mating the male injects chemicals (probably peptides) from its accessory glands into the female's haemolymph which permanently (in the majority of cases) switch-off the female's responsiveness and reduce her attractiveness to other males. The male thus assures his gametes are not soon displaced by another male's. Separate openings on the penis deliver the accessory gland contents to areas of vaginal wall which the penis has abraded to improve the efficiency of transfer of these compounds.

The female normally receives sufficient sperm for a lifetime of egg-laying from this mating. Thus being unreceptive may be a gain for her in saving time that would be wasted by repeated matings with males that wait at the oviposition site. However, a male may transfer few or defective sperm. It would seem of advantage to the female to be able to check her sperm store and regain receptivity if the store is low.

About 25% of females regain receptivity with time and about 40% if given a continuous opportunity to lay. However there is no association between regaining receptivity and a low sperm store. It seems likely that the physiological mechanism is unable to give the female this information.

R. Thornhill & J. Adcock (1983). The Evolution of Insect Mating Systems. Harvard Univ. Press, Cambridge Mass.

CSIRO Division Entomology,  
G.P.O. Box 1700,  
Canberra,  
Australia.

**Relationship Between Mated Status and Stage of Ovarian Development in Females of the Sheep Blowfly, Lucilia cuprina, in the Field.**

The relationship between mated status and ovarian development in the Australian sheep blowfly was studied in the field. Females of L. cuprina were hand-caught at baits and their mated status and stage of ovarian development determined by dissection.

Females of L. cuprina display distinct ovarian cycles in which batches of eggs are developed synchronously. Most females become mated when their first cycle oocytes were immediately pre-vitellogenic. The period over which most matings occurred is equivalent to about 15% of the time required for maturation of the first egg batch. Similar results were obtained with wild flies, released laboratory reared wild-type flies and laboratory-reared-genetically altered flies.

The relationship between mated status and ovarian development in hand-caught females was compared with that in females which had spent more than one hour in the collection chamber of traps which had been seeded with sexually mature males. The results were generally similar, which indicates that females are usually mated in the field soon after they become receptive. The findings are discussed in relation to laboratory studies on factors affecting sexual receptivity of females and to operational sex ratio in the field.

**Spatial Interactions of Two Bush-dwelling Cockroach Species**

Data from two years live-trapping of Celatablatta undulivitta and C. vulgaris (Blattidae) on a grid system in Kanuka-beech forest show considerable overlap of the two species in seasonal and spatial distribution patterns. Mixed-species aggregations occurred in most traps throughout the year. Analysis using the 'interspecific mean crowding' model of Iwao (1977) indicates that at densities above 2-3 C. undulivitta per trap the occurrence of C. vulgaris became less frequent than would be expected if the two species occurred independently. The reverse relationship, however, indicates that C. vulgaris probably had little effect on C. undulivitta. Laboratory investigation of behavioural interactions and social distance at three different levels of 'mean crowding' (Lloyd 1967), and during the 'active' and 'inactive' phases of their daily activity cycle, suggest that the behaviour of C. undulivitta directly influenced relative numbers of C. vulgaris per sampling unit in the field, thus providing a biological basis for the model.

Department of Zoology,  
Victoria University of Wellington,  
Wellington,  
New Zealand

**Captive Management of Black Stilts**

Black stilts (Himantopus novaezealandiae) are New Zealand's rarest endemic wading bird species, existing as a single population of less than 40 adult birds in the McKenzie Basin, South Island. Eight fertile eggs were removed from this population and hatched in incubators. The resulting chicks were hand-reared in captivity and used to establish a captive breeding population. One pair bred successfully. I observed and described the behaviour patterns and breeding biology of this pair, quantified their daily and seasonal activity and made a comparison of productivity with pairs in the wild population. My results are discussed in relation to the role captive breeding could play in increasing the black stilt population in the wild.

Department of Botany and Zoology,  
Massey University,  
Palmerston North,  
New Zealand

COULSON, R.\*, COULSON, G. &  
WAKEFIELD, W.

**Breeding Behaviour of Kelp Gulls and Pacific Gulls in south-eastern Tasmania**

A mixed colony of Kelp Gulls, Larus dominicanus, and Pacific Gulls, L. pacificus, on Green Island, south-eastern Tasmania, was monitored through one complete breeding season. Kelp gulls nested in a variety of habitats (rocks, thistles, grassy swards and against tussocks) while Pacific Gulls nested mainly beside large tussocks and did not nest in open areas. Kelp Gulls began nest construction earlier but began egg laying later than Pacific Gulls. The two species nested at similar densities. There were marked differences in the behaviour of the unfledged chicks when disturbed. Kelp Gull chicks would run, often into the water, shortly after hatching, whereas Pacific Gull chicks would remain motionless under tussocks adjacent to the nest until fledged. Newly-fledged Pacific Gulls were frequently attacked by adult Kelp Gulls, but attacks on young Kelp Gulls by adult Pacific Gulls were not observed.

\*Centre for Environmental Studies,  
University of Tasmania,  
Hobart,  
Tasmania,  
Australia

Present Address:  
Institute of Early Childhood Development,  
Kew,  
Victoria,  
Australia

**Winter Energetic Strategies of Birds in Temperate Wet Forests in Australia**

Decreased food abundance and the shorter day length for foraging make it difficult for birds in the temperate zones to meet the increased daily energy requirement induced by low ambient temperatures in winter. Of north temperate bird species, 30-50 per cent circumvent the problem by seasonal return migration to lower latitudes; non-migrants increase their daily foraging time and have to obtain food items at very rapid rates.

In Australia, temperate zone birds appear to encounter a similar energy balance problem in winter, but very few are seasonal migrants. Studies of the behavioural energetics of a resident parrot and two small, insectivorous passerines in temperate wet forest in S.E. Australia revealed no significant increases in daily foraging time in winter. The three species, however, appear to have evolved differing energetic strategies as solutions to their winter energy balance problems.

The daily energy expenditure of Crimson rosellas did not change from autumn to winter. Their increased thermoregulatory requirement was offset by a reduced daily time-energy expenditure on foraging, facilitated by an energy-dense diet, and an increase in the time spent inexpensively resting. The tiny Brown thornbill met its increased daily energy requirement in winter primarily through a 1.5-fold increase in prey capture rate and the Southern yellow robin mainly by reducing the metabolic cost of activity through substitution of energetically inexpensive behaviours for costly ones.

In comparison with findings for the north temperate zone, these results suggest that winter conditions at low altitudes in wet temperate forests in Australia impose smaller additional energy demands which birds can generally meet by less drastic solutions than migration and dramatic changes in the time-energy budget.

Departments of Psychology and Zoology,  
Monash University,  
Clayton,  
Victoria, 3168,  
Australia

**Foraging Behaviour of Honeyeaters and the Pollination of Flax**

New Zealand flax (Phormium tenax; Phormiaciae (Agavaceae)) reproduces asexually by offsets and sexually by large inflorescences. Flax predominantly outcrosses but as adjacent offsets often flower at the same time the probability of selfing is high.

Flax inflorescences are relatively simple allowing ready following of the movements of visiting tui (Prothemadero novaeseelandiae) and bellbird (Anthornis melanura) (Meliphagidae). These honeyeaters move in predictable ways both within an inflorescence and between inflorescences. Some of these movements relate to nectar rewards, others do not.

Ideas of limitation of fruit set due to the behaviour of pollinators have two aspects. Firstly, are flowers visited and do they receive pollen and secondly, if pollen is transferred, is the range of possible mates compatible (outcrossed pollen) or not (selfed pollen)? The first effect of insufficient visits to effect pollination is readily demonstrated for some inflorescences. The second effect is greatly dependent on the social status of the birds, residents effecting more outcrossing than non-residents. Experiments with captive birds confirmed that pollen carryover between feeding bouts or within long bouts was not a confounding factor. The behaviour of the honeyeaters will be discussed in relation to final seed set.

Department of Zoology,  
University of Auckland,  
Auckland,  
New Zealand.

**The Role of Habitat Structure as a Determinant of Grouping of the Western Grey Kangaroo, Macropus fuliginosus.**

Grouping patterns of the Western Grey kangaroo, Macropus fuliginosus, were examined at Hattah-Kulkyne National Park in north-western Victoria. The park has four major vegetation associations: dune herbland, perennial lakes, floodplain woodland and mallee scrub. Horizontal vegetation cover was assessed by basal area and sighting distance measures. Population density and group size in these habitats were monitored seasonally over a two year period, using permanent line transects. There were frequent short-term shifts in population density between habitats, and a wide range of densities was recorded. The major determinant of group size was vegetation cover; large groups occurred in more open habitat. Population density was a minor determinant of group size, with a low positive correlation. This tendency to increase group size in more open habitat is interpreted as an adaptive response to cursorial predation in the evolutionary history of the species.

Department of Zoology,  
University of Melbourne,  
Victoria,  
Australia

**Development and Testing of Mustelid Scent Lures**

The use of trap lures derived from the anal gland secretions of ferrets is investigated. Bioassay experiments show that ferrets find some volatile components of their anal gland secretions more attractive than others. The combination of 2,3-dimethylthietane and 2-propylthietane was the most attractive combination tested. It was used as the active ingredient of an artificial scent lure tested in field experiments. When given a choice of traps to enter, ferrets preferred to enter traps containing edible bait than those containing the artificial scent lure. In a no-choice situation, however, as many ferrets were caught on lure as on bait. The production of the lure in a long-lasting form, and testing its effectiveness in trapping stoats are discussed.

Department of Botany and Zoology,  
Massey University,  
Palmerston North,  
New Zealand.

**The Response of Grazing Cattle to Pasture Contaminated with Possum  
(Trichosurus vulpecula) excreta**

A suggestion arose from the possum surveillance and Tb eradication programme that cattle could be attracted to grass where possum dung and urine is present. Three 2-day grazing trials were conducted 5 months apart to test the response of yearling bulls to 3m x 3m grass plots sprayed with possum excreta. Trial I used a dung and urine slurry; trial II urine and dung separately and trial III excreta from possums caught in the wild. Matched control grass plots were sprayed with water and observations were made during the peak grazing (1½h) period after the bulls entered their new grass break for the day.

Apart from sporadic nibbling (grazing longer grass heads) the bulls avoided the excreta treated plots. Visual estimations of remaining herbage 7 and 24 hours after grazing began confirmed the results of the behaviour observations. After rain, urine plots were grazed before dung-treated areas. Overall results indicated that provided adequate pasture was available, cattle avoided herbage contaminated with possum excreta.

**Which Senses do Cattle Use to Determine Whether an Electric Wire is Pulsed?**

Cattle were filmed when feeding under a wire that was either pulsed with an electric current (on) or not (off) under several experimental conditions. Experimental treatments included the fitting of blinkers that prevented rearward visions, and shaving neck hairs. With the aid of analysis of data from individual film frames the following conclusions were reached:

1. Steers use vision as well as pressure on (bending of) neck hairs to guide them in relation to the wire.
2. Steers cannot sense whether the fence is on or off, unless they get a shock.
3. The behaviour of steers towards the wire seems to be determined by their expectation that the wire is in the same state that it was in on the previous occasion.

Department of Agriculture and Forestry,  
University of Melbourne,  
Parkville,  
Victoria, 3052,  
Australia

### Some Responses of Sheep to Husbandry Procedures

An investigation of the sheep's behavioural and physiological responses to routine management procedures is being undertaken to assist in answering questions about animal welfare and as a baseline against which to assess novel sheep handling methods.

The first experiment examined the overall response of groups of ten sheep to one of five common handling treatments: shearing; crutching; drafting; dipping; drenching. Parallel experiments examined either haematocrit and cortisol responses or behavioural responses, particularly as manifested in flocking behaviour (distribution, orientation, nearest neighbour distance).

The response to the treatments was greatest for sheep that were shorn or crutched, with shorn sheep exhibiting a more sustained elevation of plasma cortisol.

In the second experiment, a closer investigation was made of three possible stressors encountered in conventional shearing. This study took the form of a factorial experiment, the factors being: wool removal (+/-); inversion (+/-); isolation (+/-). As in the first experiment, groups of ten sheep were used and the experiment was in two parallel parts examining either blood or behavioural parameters.

Wool removal appears to be the most potent of the three factors in eliciting a response, with the suggestion of some interaction between inversion and isolation.

In addition to aiding the understanding of the effect of farm handling procedures on sheep, these experiments give some indication of the effects of sampling procedures used in such experiments. The results also suggest that investigations into variations in response between animals might further the understanding of animal handling.

School of Agriculture and Forestry,  
University of Melbourne,  
Parkville,  
Victoria, 3052,  
Australia.

### Cattle Behaviour in a Saleyard

Bruising of beef costs the Australian industry at least \$36 million each year and saleyard handling procedures may contribute significantly to this loss. In a study at the Brisbane Abattoirs in late winter and spring, drafting and weighing followed by unloading, had the greatest potential to inflict injury on the cattle. Observations of agonistic behaviour (butting and attacks) showed no difference in initiation rate by either horned or hornless cattle. Most butting occurred in the holding yards and the neck and flank regions were butted more often than the hindquarters.

Unloading, drafting and weighing frequently resulted in heavy contact with solid objects, particularly on the back and upper hindquarters.

Shading behaviour was most noticeable in British-breeds, whereas Brahman type cattle rested without much shading.

Problem areas in saleyards are the unloading, drafting and weighing yards. These areas involve stockmen and casual labourers moving cattle. These men may, by rough and abusive handling, cause behaviour which is damaging to cattle.

\*Department of Animal Production,  
University of Queensland,  
St Lucia, 4067,  
Australia.

\*\*Department of Physiology and Pharmacology,  
University of Queensland,  
St Lucia, 4067,  
Australia.

### The Effect of Feeding Regime on Agonistic Interactions in Group-Housed Sows

Concern about the welfare of non lactating sows housed in tethers and stalls is forcing the pig industry to consider alternative forms of housing. Group housing systems have received the most attention, but a major problem is that severe fighting amongst the sows can occur.

A group housing system has been developed which utilises partial barriers along the food trough. Groups of four sows, housed at 1.84m<sup>2</sup>/sow, have been kept in this system for two week periods during three successive gestations. As far as possible the same sows were grouped together on successive trials. In addition to the pen design with the barriers, the groups of sows were fed by three methods:

- i) 1kg of feed was placed in each feeding bay twice daily;
- ii) 1kg of feed twice daily, as above, plus straw ad libitum;
- iii) Feed available ad libitum in all of the feeding bays.

The partial barriers allowed sows to feed together with minimum conflict, even when they were ration fed. When fed ad libitum no conflict was seen when sows were feeding, because the four sows never fed at the same time. Straw appeared to have no effect on agonistic interactions because most sows ignored it. Some sows were seen to chew straw occasionally, but it was not used by the sows to provide additional bulk in their diet, as was planned by the experimenter!

Agonistic interactions between sows took place at times other than feeding. This was most apparent on the day of grouping when severe fights occurred, presumably during the establishment of a social order. Later in the trial agonistic interactions appeared to result just from confrontations between sows in limited space.

The partial barrier design makes considerable savings in space allowance and hardware as, unlike most full feeding stalls, the feeding bays are available for behaviours other than feeding, and at all times. It was noted that "aggressed" sows would frequently retreat into the feed bays, effectively terminating the agonistic interaction.

Department of Animal Production,  
University of Queensland,  
St Lucia,  
Queensland 4067,  
Australia.

**Welfare and Behavioural Problems in Domestic Animals: A Systematic Approach**

Animal Welfare is a topical issue of world wide interest. This current interest arises from the 1965 British parliamentary inquiry conducted under the chairmanship of Professor F.W.R. Brambell which resulted in the publication of "The Welfare of Animals Kept under Intensive Husbandry Systems". It is the responsibility of all who are involved with animals to be concerned about the welfare of those animals. There is a lack of literature which informs husbandry officers, veterinarians, or agriculturalists how to approach systematically, welfare problems. Behavioural change is usually the first indication that the health and welfare of animals is at risk.

This paper presents a systematic method for analysing changes in animal behaviour to ensure that major factors will not be overlooked. This method also allows the welfare of the animal to be quickly assessed and managed.

\*Department of Animal Production,  
University of Queensland,  
St Lucia,  
Queensland, 4067,  
Australia

\*\*Department of Medical Laboratory Science,  
Queensland Institute of Technology,  
Brisbane,  
Queensland 4000,  
Australia.

**A Critique of Helping Behaviour in Birds: Departure from Functional Explanations**

Helping, defined here as the activity of feeding immature birds in the absence of parent-offspring relatedness, is perceived generally as a discrete behavioural action with a unique genetic basis that has only evolved in individuals that breed cooperatively. Under the assumption that helping has evolved by the process of natural selection, current research is directed primarily at investigating the functional adaptiveness of helping behaviour, especially in terms of inclusive fitness theory. We argue that this solely functional approach restricts the perception of the behaviours associated with cooperative breeders as well as our understanding of how such behaviours persist within certain populations.

Alternatively, we define provisioning behaviour as an activity where an individual feeds a dependent or semi-dependent immature bird, a behaviour usually seen in the context of parents feeding their own young. A review of the endocrinology literature and captivity studies reveals that hormonal or breeding condition is not a necessary prerequisite for expressing provisioning behaviour, but exposure to a proper stimulus is. For most species, provisioning is not elicited until individuals mate and come in contact with their own offspring. However, in situations where young do not disperse immediately from their natal territories or when more than one breeding pair nest within a single social unit, individuals can potentially encounter and interact with begging offspring that are not their own. Both of these conditions regularly occur in cooperative breeders. The observation that non-parents of some species invariably exhibit provisioning behaviour may be indicative of the invariable environmental condition in which these species normally develop. Feeding another's offspring can be an adaptive response in cooperative breeders, but we do not believe the behaviour itself to be the result of a selective process unique to the cooperative breeding context. Therefore, rather than use adaptive functions as criteria for explaining why birds feed young that are not their own, we feel that a basic understanding of the control and development of provisioning behaviour is essential in order to understand why such behaviours are exhibited by both breeders and non-breeders of group-living birds.

Department of Zoology,  
University of Auckland,  
Auckland,  
New Zealand.

**Song Repertoires in Group-living Australian Magpies (Gymnorhina tibicen)**

The Australian Magpie is a facultatively group living oscine song bird. Magpies live on territories they defend year-round, and there is also an amorphous flock of non-territorial birds. Birds of both sexes sing communally to defend and advertise territory ownership, and also in non-aggressive contexts. We tape recorded songs of all individuals in six different territorial groups and three flock members. We described and classified song elements in the repertoire of each bird, and then compared the degree of element sharing across and within groups. Magpies share a higher percentage of their repertoire with members of their own group versus outsiders. Shared sounds may play a role in recognition and cohesion among group members.

1. Department of Botany and Zoology  
Massey University,  
Palmerston North,  
New Zealand.
2. Department of Psychology,  
University of Maryland,  
College Park,  
MD20742,  
U.S.A.

**The Division of Labour in a Queenless Ant Species, Rhytidoponera sp. 12**

Queens do not exist in Rhytidoponera sp. 12, a large ponerine ant occurring in arid regions. Crozier et al. (1984) showed that the levels of genetic relatedness between workers in a colony (as determined by electrophoretic analysis of allozyme variation) are relatively low, which indicates that there are many egg-layers. Pamilo et al (1985) reported that a large number of workers have active ovaries, although only a small proportion of them are mated.

Preliminary results show that mated workers have ovarian characteristics which are distinct from those of unmated workers. The oocytes in the latter do not develop normally and accumulate in the ovaries. Thus only mated workers lay eggs. These laying individuals occur in small numbers in various parts of the nest, and there is no evidence for social regulation. A reproductive system of this kind produces a distinct population structure, and this will be discussed in the light of the existence of distinct colony identities and the mode of colony multiplication.

School of Zoology,  
University of New South Wales,  
Kensington,  
NSW 2033,  
Australia.

**Fidelity and Reproductive Success in the Adelle Penguin**

Breeding success in Adelle penguins is largely determined by the ability of the breeding pair to coordinate their pattern of nest relief. Evidence would suggest that some Adelle penguins are able to regulate the duration of their feeding trips away from the nest, which would imply they possess some sort of endogenous biological clock. Approximately 50% of Adelle penguins change their mates between seasons. Those birds were unable to coordinate their nest relief patterns were the ones which changed their mates.

Department of Zoology,  
Otago University,  
P.O. Box 56,  
Dunedin,  
New Zealand

**Ontogeny of the Phototactic Response in Starlings (Sturnus vulgaris)**

The phototactic response of nestling starlings changes at about the time they are able to fly. Before they can fly they move away from light and subsequently they move toward light. The change in behaviour is rapid and unlike most new behaviour patterns does not involve a period of refinement. The latency of response is not related to how recently an individual has changed behaviour. Winglength and weight are good predictors of how an individual will behave. Those with low weight relative to winglength change first. Experimental manipulation of weight appears to change response time and definitely alters the latency of response, with heavier birds taking longer to respond.

Department of Botany and Zoology,  
Massey University,  
Palmerston North,  
New Zealand.

### How Do Schooling Fish Maintain Position?

A school of fish has both internal structure of a limited kind and an external shape. Both depend on rules governing the way individuals position themselves relative to others. For several species the information on the internal structure of small schools suggests the fish maintain a compressable, spheroidal individual space around themselves with few constraints on the packing of these spheroids.

Lagged correlations of speed and swimming direction of pairs of individuals show which individuals are leaders in the sense of initiating change or speed and direction which are adopted by others. These initiators are usually fish towards the front of the school. This dependence on positioning relative to leading fish may explain the puzzling fact that nearest neighbour spacing in small fish schools decreases as the number of fish increases.

Department of Zoology,  
Monash University,  
Clayton,  
Victoria, 3168,  
Australia.

**Failure to Condition a Prey Aversion in an Australian Raptor, the Wedge-tailed Eagle (Aquila audax).**

One tenet of the 'ecological' model of toxicosis learning popularised by Garcia and his co-workers is that toxicosis-learning techniques should provide a relatively simple and economical means of predator control through the induction of conditioned prey aversions. Brett, Hankins & Garcia (1976) successfully utilized these techniques in the red-tailed hawk, Buteo jamaicensis, and the rough-legged hawk, Buteo lagopus. We were interested in a related aspect of predation: the induction of a conditioned aversion to a potential object of prey in a cage-reared wedge-tailed eagle (Aquila audax) that was to be released into the wild. The potential prey, chicken, had been regularly fed to the eagle in the past. To try and effect this change in dietary preferences a series of six conditioning trials were undertaken. On each occasion the eagle was given the carcasses of 1-2 chickens laced with an illness-inducing agent - lithium chloride (LiCl). Initially a conditioning dosage of 1.027mg/kg of the eagle's body weight was used, but this was progressively increased to a maximum of 3.423mg/kg by the end of the study. At the initial dosage level no signs of illness were apparent. There was no evidence of diarrhoea, excessive water consumption, shivering, or feather ruffling as has been reported in other avian species. With increased dosages the eagle began to display some signs of distress, and a copious fluid discharge from the nasal area was also observed. The eagle did not display more than limited evidence of an aversion to the prey item as measured by the latencies and to seize and consume chickens, even after six conditioning trials. In the later trials the eagle tended to defer consumption of the body parts laced with LiCl (the head, thighs, and breast), however in all trials the entire carcass was eventually eaten. It seems that, first, when the prey item is a habitual food the induction of a conditioned prey aversion is difficult to achieve, and second, the high dosages of LiCl required to induce illness in the eagle implies that LiCl may be relatively ineffective in this animal. The results of this study will be discussed in terms of the psychological aspects, in particular, the role of the saliency of the conditioned stimulus; and also in terms of the physiological aspect of the possible role played by the nasal glands in mediating the efficacy of LiCl.

Brett, L.P., Hankins, W.G. & Garcia, J. (1976). Behavioural Biology, 17 : 87-98

Department of Psychology,  
University of Sydney,  
NSW,  
Australia.

Department of Behavioural Biology,  
Australian National University,  
Canberra,  
ACT,  
Australia.

School of Behavioural Sciences,  
Macquarie University,  
NSW,  
Australia

**Communal Breeding and Parasitism: The Whitehead and the Long-tailed Cuckoo**

Whiteheads (Mohoua albicilla) are small (14-20g) passerines which breed in groups of 2-8 birds. On Little Barrier Island they are parasitised by the Long-tailed Cuckoo (Eudynamys taitensis). One female whitehead builds the nest, lays all eggs and carries out all incubation. During these stages of breeding she is attended by one or two males. Other birds (some of which are last year's fledglings) assist in rearing the brood. Female whiteheads hide from a stuffed cuckoo placed near the nest. Males and associates mob the cuckoo. Fledgling cuckoos benefit from communal breeding by whiteheads: the more whiteheads, the more food received by the cuckoo.

\*Department of Zoology,  
University of Canterbury,  
Christchurch.

\*\*Auckland Institute and Museum,  
Auckland  
New Zealand

**Conditioned Flavour Aversions - Some Properties of Odorous Stimuli**

The phenomenon of one trial learning of a conditioned flavour aversion in the rat, has been widely studied in recent years as well as being used in the study of learning and memory processes. Further insight into food selection and the interaction of odour and taste could be obtained using flavour aversions.

One aspect of the conditioned flavour aversion phenomenon which has received little attention has been the affect of the stimulus on this process. Previously<sup>(1)</sup>, I have shown that odorants vary markedly in their ability to act as conditioning stimuli. The present preliminary results take this step further and show that:

1. A solution of an odorant in water appears to be recognised by the rat as a different stimulus to the same odorant presented in an air stream; that is, the rat can differentiate between the gustatory and olfactory sensations of a chemical.
2. The quality and intensity of the test stimulus needs to be similar to the conditioning stimulus to produce an aversion on the test day.
3. Extinction of the aversion can be produced using an odour different to the conditioning stimulus and one to which no aversion is shown.

These results suggest that whereas extinction (learned safety) can be generalized across different odours, a learned aversion is specific to the quality and intensity of the conditioning stimulus.

**Reference**

1. Panhuber, H. (1982). *Physiology of Behaviour*. 28 : 149-154

CSIRO Division of Food Research,  
North Ryde,  
NSW, 2113,  
Australia .