

Promoting awareness of the Three Rs

The Three Rs (replacement, reduction and refinement) have a pivotal place as instruments for helping to minimise the cost, or harm, caused to animals by scientific procedures. They have the specific objectives of (1) avoiding the use of animals altogether, and, if that is not practicable, of ensuring (2) that the minimum number of animals compatible with achieving the purposes of the work is used, and (3) that the noxiousness of the procedures imposed on those animals which are used is minimised.

The Three Rs are not an end in themselves. They are an instrument to assist scientists when designing their experiments, and members of animal ethics committees when considering them, to evaluate rigorously one side of the utilitarian cost-benefit analysis which is required before scientific procedures

may be permitted - namely, assessment and minimisation of the cost or harm to the animals involved. The other side is assessing and maximising the anticipated benefits. This is not a trivial process. If it is given anything less than the most rigorous attention - if the cost or harm to the animals used is not minimised and the benefits for other animals and/or people are not maximised, so that the difference between the cost and benefit is less than the greatest that we can feasibly achieve - then the utilitarian ethical justification for the proposed activity is weakened (Battye, 1994, 1998, Mellor, 1998).

Awareness of the Three Rs tenet and its role in the humane and responsible conduct of animal-based science and testing has gained ground substantially among those with strong interests in the ethics of such animal uses

(Abstracts, 1993; van Zutphen and Balls, 1997). In contrast, the Three Rs tenet itself and its role do not appear to be particularly well known among animal users themselves, the wider scientific community or the general public. Accordingly, there is a need to improve awareness of the Three Rs among the practitioners of animal-based science and testing. It is noteworthy, however, that when the Three Rs are applied, it often appears to occur as an implicit activity in which minimising financial cost, and maximising convenience and the scientific value of the results, achieve much the same ends as does explicit application of the Three Rs tenet as an ethical principle. This is especially so with replacement and reduction because of the high cost of animals.

Some would argue that it matters little whether or not the outcomes of replacement, reduction and/or refinement are achieved by the conscious application of the Three Rs tenet as a part of the utilitarian ethical justification for animal-based science, or by a fortuitous result of considering economic, scientific and/or convenience issues during the formulation of applications to animal ethics committees, provided that the Three Rs

outcomes are achieved. There is force in that argument, at least as an interim stage while animal users become more conversant with major ethical issues which are relevant to their activities. In the longer term, however, a more ethically literate community of animal users who can demonstrate an understanding of the value systems which guide their uses of animals, including the precise practices they employ and the justifications for them, would better generate confidence and maintain public support for such activities. The interests of the public, as represented by the independent members of animal ethics committees, as well as the interests of animal users, would both be served by such an outcome.

Accordingly, it is worth considering a number of specific initiatives, which are in tune with international developments (Balls *et al.*, 1995) and which would have the following objectives:

- to encourage an explicit awareness among animal users of the place and role of the Three Rs in the ethical framework supporting scientists' use of animals;
- to demonstrate that explicit and meaningful consideration has been given to

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the Three Rs tenet during the formulation of each and every application to animal ethics committees;

- to demonstrate that explicit and meaningful consideration has been given to the Three Rs tenet as part of the editorial review process for Australian and New Zealand scientific journals; and
- to increase awareness of the Three Rs within the wider scientific community and the general public.

Initiatives

Initiative 1: Promotion of ANZCCART publications which clarify ethical issues for animal-based scientists.

The place of the Three Rs in the utilitarian justification for scientific animal use has been clearly and simply explained in Monamy's (1996) monograph entitled, *Animal Experimentation: A Student Guide to Balancing the Issues* (published by ANZCCART) and in *Ethical Approaches to Animal-Based Science*, the proceedings of the 1997 Auckland conference (Mellor, Fisher and Sutherland [Eds], 1998). In addition to strongly recommending both publications to animal ethics committees as valuable background reading for all of their members, two further steps could be taken. Animal ethics committees could (1) draw these readable publications to the attention of each of their applicants, and (2) those committees in tertiary institutions should consider recommending strongly that these two publications be listed as very highly desirable reading for all senior undergraduate students or junior postgraduate students in animal-based sciences.

Animal Experimentation (Monamy, 1996) perhaps could be made compulsory reading for such undergraduates.

Initiative 2: Facilitating explicit consideration of the three Rs by scientists and animal ethics committees.

At least two approaches are possible, neither of which needs to be particularly time-consuming for the applicants.

First approach

Each application to an animal ethics committee must include a description of all procedures to be applied to the animals and a justification for the number of animals it is proposed to use. It would be quite straightforward to include in that description brief mention of the consideration that had been given to the Three Rs:

- (1) why sentient animals or their tissues need to be used (i.e. why replacement is not a feasible option);
- (2) justifications, including statistical requirements, showing that no more and no less animals are to be used than are required to meet the objectives of the work, and also any 'sharing' of animals or their tissues to allow other related or unrelated objectives to be explored (i.e. the way or ways reduction has been achieved); and
- (3) how the proposed procedures have been designed to minimise their invasiveness and thereby any pain, distress or lasting harm which may otherwise be caused to the animals (i.e. what refinements have been employed).

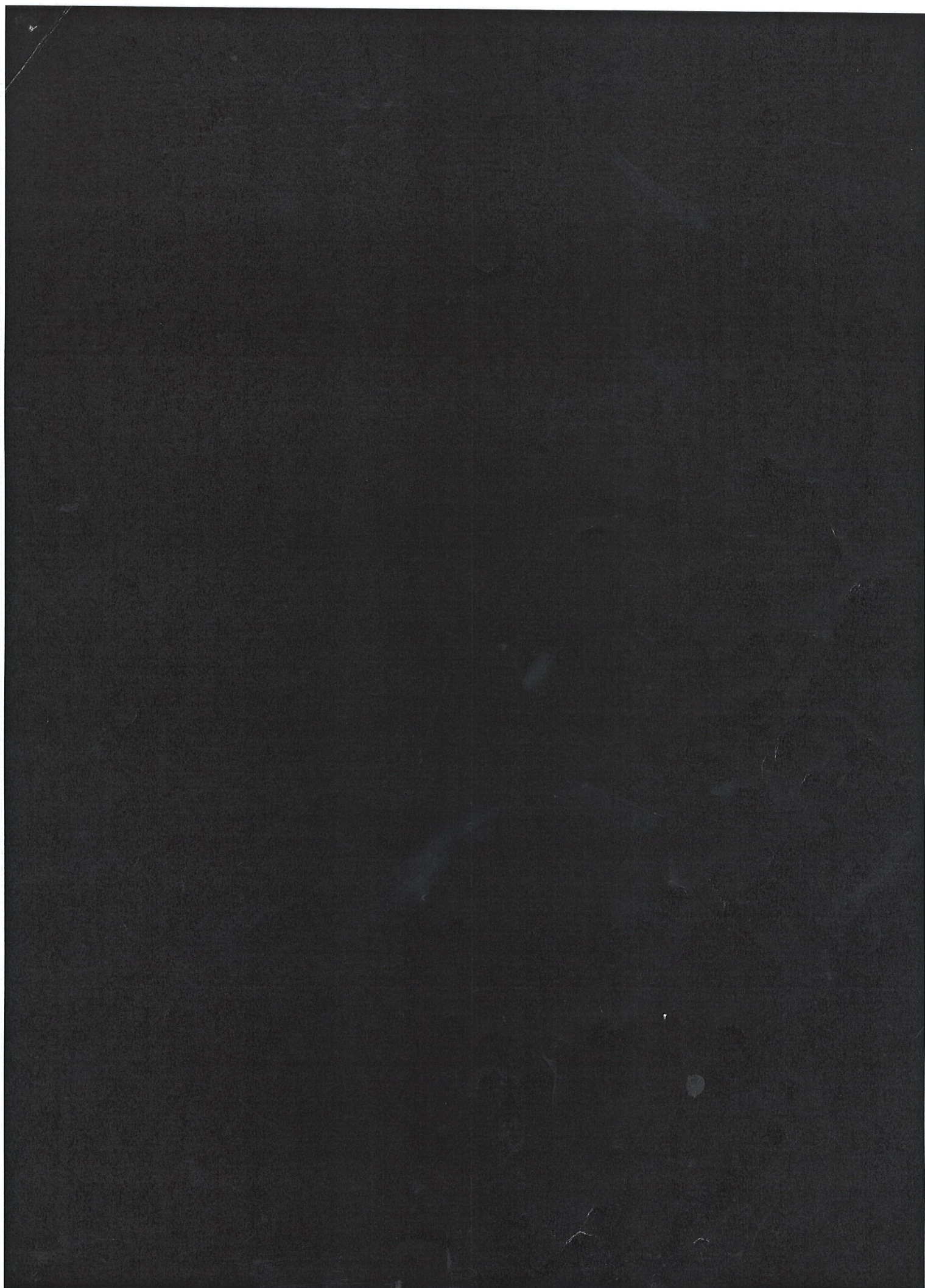
Second approach

Alternatively, a new three Rs section could be introduced, or an existing one modified, in each application form submitted to animal ethics committees. This would have the advantage that it would highlight the need for explicit reference to the way the Three Rs had been considered during the preparation of each application. A disadvantage is that it could be perceived as an extra burden on applicants, which they might resent, and could be met by ritualised formulas of words which would merely give the appearance of Three Rs consideration. Nevertheless, heightening Three Rs awareness, however initially ritualised it might be, is a worthwhile goal, and this potential disadvantage should not prevent us from making the attempt. Thus, a Three Rs section on animal ethics committee application forms could be cast in a manner resembling that set out below.

Replacement, Reduction, Refinement (the Three Rs)

As an animal-based scientist you have an ethical responsibility to apply the Three Rs tenet in your work: you must minimise the number of sentient animals you use by substituting, where feasible, alternatives to their use (replacement), you must minimise the number of animals exposed to noxious procedures (reduction), and you must minimise the noxiousness of the procedures you apply (refinement). Please answer briefly the following three questions.

- (1) Why is it necessary to use sentient animals to achieve the goal(s) of this work?



experimental design and planning. Editorial policy, which recognises the importance of the three Rs in experimental design, can make an important contribution to achieving a balance between animal welfare and scientific objectives and, thus, can complement regulations, guidelines and institutional review processes. The Journal of the American Veterinary Medical Association recently adopted such an editorial policy (Matushek, 1996), which articulated the principles embodied by the Three Rs, although the Three Rs were not named explicitly. Such policies need not be expressed in terms which intimidate authors in any way. They do, however, communicate a commitment to the Three Rs and ensure that the written record of the research undertaken confirms that animals were used in a humane and responsible manner, an important commitment to note for the general public.

An examination by Boisvert (1997) of the extent to which such animal welfare policies are pursued actively by journals indicates that, although a start has been made, much work remains to be done. It is therefore heartening to note the summarised conclusions of a workshop involving representatives of 11 animal-based science journals (Festing and van Zutphen, 1997), which strongly supported the formulation and adoption of such editorial policies.

ANZCCART could provide leadership on this matter by approaching appropriate scientific journals in Australia and New Zealand to encourage them to consider adopting similar policies. To this end the ANZCCART(NZ) Board has set up a Working Group with the following purposes:

- to review editorial policy statements which have already been developed on this matter by journals,
- to note briefly all the main points included in those statements in a form that would assist editorial boards to formulate their own policy,
- to prepare a list of all New Zealand scientific journals to be approached by ANZCCART(NZ) Board members, and
- to prepare introductory letters to all of those journals as a prelude to visiting them to discuss this matter.

Initiative 4: Promotion of the three Rs to the wider scientific community and the general public.

Although the seminal Russell and Burch text *The Principles of Humane Experimental Technique* was first published in 1959, it is accepted that its significance to animal-based scientists has only been recognised relatively recently. It is not surprising, therefore, that familiarity with both the text and the Three Rs tenet outlined therein is minimal among both the wider scientific community and the general public.

Ways forward for the Three Rs concept were discussed in 1995, at a European Centre for the Validation of Alternative Methods Workshop (Balls *et al.*, 1995). In addition to agreeing to 58 conclusions and recommendations, the workshop participants "Unanimously reaffirmed the principles put forward by Russell and Burch, i.e. that humane science is good science and that it is best achieved by vigorous application of the Three Rs. Thus, the only acceptable ani-

mal experiment is one which uses the smallest possible number of animals and causes the least possible pain or distress which is consistent with the achievement of a justifiable scientific purpose, and which is necessary because there is no other way of achieving that purpose. Any proposed experiments on animals should be subjected to prior and effective expert review by an ethics committee or an equivalent body. The Three Rs should be seen as a challenge and as an opportunity for reaping benefits of every kind - scientific, economic and humanitarian".

The importance of the Three Rs and the need to promote an awareness of them is recognised by the New Zealand National Animal Ethics Advisory Committee (NAEAC) in both its Strategic and Operational Plans. In the latter, the value of a "lay publication" being produced is noted. This emphasis on effective communication with the lay public complements the discussion conducted recently in ANZCCART News (Nerlich, 1997; Mellor, 1997; Williams *et al.*, 1997) of the crucial part played by lay descriptions of scientific procedures in applications made to animal ethics committees.

NAEAC intends to give such a lay publication operational priority during 1998 along with the following initiatives:

- encouraging all AECs to purchase copies of *The Principles of Humane Experimental Technique* (Russell and Burch) and *The Three Rs: The Way Forward* (Balls *et al.*, 1995), and promoting them within their respective organisations;
- making available videotape copies of the presen-

tations by Balls and Russell to the 1996 Utrecht Alternatives Conference;

- liaising with MAF regarding communicating the Three Rs concept in both the general media and in specialised education sector publications;
- liaising with MAF regarding general media coverage of Three Rs "success stories" such as the complete replacement of several animal tests and a dramatic reduction in animal use during the production of veterinary vaccines;
- liaising with ANZCCART regarding submission of general articles on the Three Rs to relevant New Zealand scientific journals;
- liaising with ANZCCART and the Universities Federation for Animal Welfare (UFAW) regarding the possible production of a Three Rs videotape to commemorate UFAW's 1959 first edition of the Russell and Burch text.

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New Chairman of ANZCCART in New Zealand

Dame Ann Ballin retired on 31 December 1997 as the inaugural Chairman of ANZCCART New Zealand, a position she held for five years. Her successor is Mr John Martin.

Dame Ann, who gained an MA in psychology from Canterbury University in 1964, held many positions during her working career and received several awards for services to the community, the CBE in 1981, a Sesquicentennial Medal in 1990 and the DBE in 1992.

The contributions that Dame Ann made to discussion during Board meetings, her very active and pro-active assimilation of background material on animal welfare issues, her willingness to field public comment on sensitive welfare issues, and the ideas

she brought from her own perspective to the different issues with which the ANZCCART (NZ) Board dealt, have all been very much appreciated by all Board members. The successful establishment of ANZCCART in New Zealand owes much to Dame Ann.

Mr John Martin, MA(Hons), is Senior Lecturer in Public Policy in the School of Business and Public Management at Victoria University in Wellington.

Before coming to Victoria University in 1988 he was a New Zealand public servant for than 30 years.

In 1981 he was appointed to the position of Deputy Director General (Administrative) in the Department of Health; he was also Chairman of the Health Services Personnel Commission between 1984 and 1988.

Mr Martin is an Honorary Lecturer at Otago University (Wellington School of Medicine) where he teaches in the public health program. He has recently been a consultant to the OECD on accountability in government.



Mr John Martin



Dame Ann Ballin

There are three more Rs

- Responsibility of the Investigator
- Recognition (and relief) of pain and suffering, and
- Resolution of conflict.

Can animals behave irrationally?

Why does it sound strange to speak of an animal acting irrationally? I can find very few references in the literature to rational thinking by animals (and these almost always by philosophers, not zoologists), and so far none at all on irrational thinking.

Why did I bother trying? Initially because I was asked to give a talk on this theme at the inaugural conference of the Centre for the Mind in Canberra in 1997. I was fascinated by the attitudes of people (both scientists and others) with whom I discussed the topic. There is also a practical component: the way we view those beings we sometimes work with and always share the planet with is likely to colour the way we interact with them.

The *Penguin Dictionary of Philosophy* definition of irrationality is that which contradicts rationality (defined as pertaining to reason), not those mental phenomena (emotion, automatic reflex etc.) which are defined as non-rational. Too often, irrational seems to be used as a synonym for emotional, especially in critiques of animal welfare and conservation issues. An example sometimes used concerns three men, each equipped with a gun and each confronted with a hungry / aggressive lion. The first panics and runs (with no hope of out-pacing the lion), the second freezes (thus making things even easier for the big feline), and the third man quickly uses his gun. The first two are said to act emotionally, the third rationally. It appears to me to make more sense to assume the third man was also pretty emotional about being eaten,

even while acting rationally.

Those who have objected to the idea that animals can act irrationally have mostly done so for the following reasons.

- An animal which appears to behave irrationally is displaying erratic behaviour caused by conflicts between its long-evolved instinctive responses and an unnatural situation (usually created by humans).
- We can never be sure what animals are thinking or feeling, or even if they do have true thoughts or emotions.
- What we see as irrational behaviour is a lack of intellectual ability to understand the problem to be solved.
- Animals, even if capable of thoughts and feelings, are not capable of rational thought and therefore irrationality has no meaning when applied to them.

The situation referred to in the first point may often be true: we would be wrong to regard as irrational the attempts by magpie larks to fight their reflections in car mirrors (although one might expect a rational animal to eventually realise the futility). Some seem to have a degree of confidence in the perfection of instinct which is unjustified, because there is a large component of learned behaviour in many animals, especially birds and mammals, some of which interacts with instinct (an ill-defined term) in complex ways. Second, evolution

within a finite (even though very large) time-scale is not perfect (as, say an act of special creation may have been) and does not equip all animals for behaving in the most useful way in all possible natural situations. A related opinion is that of the infallibility of animals in certain areas. A dog was put down in Adelaide some years ago after biting his owner rather severely. The owner returned to his house at night and bumped into the sleeping dog. When I suggested the dog may have mistaken him for an intruder I was told in a shocked voice, "Oh, no! A dog always knows its master." But if humans, being only human, can make mistakes, why can't dogs?

As to our inability to know how an animal thinks or feels — this is a problem, but it is a problem with humans also. At times I find it hard to understand the thinking processes of my immediate family, let alone the rest of our species. Perhaps the man who froze in front of the lion had a strong religious conviction and decided rationally either that he would be saved by prayer or that this was a fate he had to bear to avoid something worse in a future life. People can, for whatever reason, deliberately fudge tests and give less than truthful answers. As for true emotions, how do we define these? Is what I feel on winning a lottery ticket identical to what you feel? If not, is your emotion less real than mine? Although I can offer no proof, or even a method of testing my opinion, I strongly suspect the difference in emotional response between

being greeted by an old friend or attacked by an aggressive stranger would at least be in the same direction whether experienced by a human, a dog or a cockatoo. And what is the relevance of emotion to rationality? Behaviour cannot be assessed for rationality except in relation to a goal, and goals always have some emotional base.

Intelligence (another ill-defined concept) is not synonymous with rationality, but sets the limits within which a being can behave irrationally or otherwise. When I call my two dogs, Elsa and Patch, from the other side of a fence, Elsa looks around and runs to the nearest gate while Patch bounces up and down on the spot, eyes bulging with eagerness. Is Patch acting irrationally or is he simply less intelligent? Another possibility is that Elsa has previously met and solved similar problems more often than Patch. Do we accuse some human individuals of irrationality when their IQ level or background experience simply haven't equipped them with the ability to solve certain problems? In interspecific comparisons it makes no sense to describe rabbits as irrational if they don't solve all problems that chimpanzees are capable of; they simply do not have sufficient intelligence (however one defines it) to solve or even to understand some of the problems.

The evidence relating to animals' use of logical reason in solving problems has been quite impressive in recent years, especially for great apes, and deserves another entire article. But even many who agree that animals are capable of logical reasoning

refuse to call any behaviour rational unless the actor can explain his or her own behaviour using language with correct syntax.

This seems to boil down to a three-fold problem of semantics. First, a rational decision is sometimes defined as one which is based on reason and giving the best chance of achieving a set goal, in which case we should call the behaviour of logical problem-solving animals rational. The second point follows immediately from this; how do we decide whether apes, parrots or dolphins trained in sign, vocal or other language are indeed using a true language? A discussion on the meaning of language would need a separate article, although I would argue that the animals involved are indulging in true communication, and that this is a highly interesting phenomenon whatever one may call it. Finally, the word 'thinking' is held by some to mean the mental processes that use words — anything else being discounted as just feeling. Although most of my thinking seems to involve silent words, logical decisions do seem at times to precede the words I later use to describe them, and at other times I have a lot of words in my head which have nothing to do with rational thought.

Are such semantic arguments of real importance or are they refuges of those who feel (rather than logically reason) that rationality is exclusively human? Is irrational behaviour exclusively a phenomenon of beings who are only human or could we say only animal (or perhaps only homoeothermic vertebrate)?

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Newly Published

New publications from the USDA

The National Agricultural Library (NAL) of the US Department of Agriculture (USDA) provides much published information on the welfare and husbandry of laboratory animals, as well as farm animals. A number of these take the form of bibliographies compiled from library databases. These list references selected according to certain descriptive terms (e.g., species of animal and subject in question), together with an abstract of the paper, (as in the Special Reference Briefs Series and the Quick Bibliography Series). These are periodically updated and are free of charge. Recent issues include:

- Housing, Husbandry and Welfare of Rodents, January 1990 - June 1997 (QB 97-04);
- Housing, Husbandry and Welfare of the Dog, January 1993 - June 1997 (QB 97-08);
- Housing, Husbandry and Welfare of Sheep and Goats, January 1995 - June 1997 (SRB 97-07);
- Animal Euthanasia, January 1990 - November 1997 (SRB 98-01);
- Zoonotic Diseases (SRB 97-04).

All are obtainable from the USDA, NAL, Beltsville, MD 20105-2351, USA. In addition, NAL has recently published a monograph on *Information Resources for Adjuvants and*

Antibody Production: Comparisons and Alternative Technologies — AWIC Resource Series No. 3 (see details in *ANZCCART News* 10(4)). Fax: 1-301-504-7125; email: awic@nal.usda.gov.

Animal Well-being

The journal *Laboratory Animal Science*, published by the American Association for Laboratory Animal Science (AALAS) devoted a major part of its December, 1997 issue (Volume 47, number 6) to a special topic overview of animal well-being. This comprised four papers, each by JD Clark, DR Rager and JP Calpin. The papers cover the following areas:

- (i) general considerations;
- (ii) stress and distress;
- (iii) an overview of assessment; and
- (iv) specific assessment criteria.

The first paper reviews current knowledge on what comprises animal well-being and how it can be defined. This includes discussion of the concepts of anthropomorphism, animal needs and of well-being *per se*. Well-being and the factors which affect it are expressed schematically. Well-being is defined as: *an internal state involving quality of life that is affected by the responses to internal and external stimuli, which may or may not be aversive. As a protective mechanism, departures from homeostasis generally elicit normal adaptive and coping responses designed to return the animal to its normal state of balance or equilibrium. Ineffective responses may result in pre-pathology, disorder, dysfunction, disability, disease or death.*

The second paper recognises that stress and disorders are integral parts of consideration of animal well-being. Stress generally refers to a state of threatened homeostasis. These activate a complex pattern of behavioural changes and responses in the central and autonomic nervous system and in the endocrine system. Some responses can be considered as normal adaptive and coping activities, while others are not. For example, a persistent threat may lead to prolonged hyperactivity of the neuroendocrine system, which impairs rather than contributes to the animal's well-being.

The authors go on to state that: *mental and biological well-being is more likely to exist in animals if they are familiar with their environment, including social groups, and if they can predict or anticipate changes in the environment.*

The third paper discusses how animal well-being can be assessed. This is a difficult matter to describe objectively and has been the source of much discussion in recent years. The authors emphasise that a variety of physiological, biochemical and behavioural characteristics change when an animal is exposed to aversive situations and stimuli. There is a need to evaluate criteria such as performance, clinical state, neurochemistry, endocrinology, immunology, morphology, behaviour and ethology, to compile a complete behavioural and biological profile of an animal. This paper considers the above criteria.

The last paper discusses specific assessment criteria for animal well-being and expands on the points made in the previous paper. The criteria include catecholamines; corticotrophin-releasing hormone; adeno-

corticotrophic hormone; glucocorticoids; prolactin; prolactin-releasing factors; serotonin; vasopressin; renin and angiotensin II; substance P; insulin and glucagon; thyroxine; growth hormone and luteinizing hormone. The paper describes the hypothalamic-pituitary-adrenal (HPA) axis and its influence on the immune system.

The authors conclude that: *potential indicators of animal well-being are general health status, clinical signs, performance, behaviour, neurochemical and endocrine factors, immune function and morphological and pathological changes. Determination of an animal's well-being should ensure that the criteria being used and the decisions being made about the animal are truly relevant to its well-being.*

Measuring pain in animals

Dr John Barnett, from the Victorian Animal Welfare Centre (see ANZCCART News 10(4): 4) has published a short overview for veterinarians of this subject (*Australian Veterinary Journal* 75(12): 878-9).

The paper discusses the difficulty in quantifying the degree of pain experienced by animals. This is especially important in animal research and in agricultural industries, where many painful procedures are routinely performed on conscious animals without the use of anaesthesia or analgesia.

Barnett points out that chronic pain resulting from husbandry procedures is often a more serious problem than acute pain. The dilemma is that the purpose of such procedures is often to obviate future suffering from conditions such as fly-strike in

sheep or cannibalism in pigs or poultry.

The paper describes how pain can be assessed, with the only tools available being the behavioural and physiological responses of animals. These do not provide a direct quantitative measure of pain and it is also difficult to determine the intensity of pain. Barnett refers to recent work using the electroencephalogram (EEG) to study pain in farm animals. This, in conjunction with behavioural and physiological measurements, appears useful. Barnett comments on the ongoing difficulty in obtaining funding for research in this area and on the role of practising veterinarians in minimising pain and suffering in animals in their charge. The principal mechanism is behavioural observation, which can be assisted by the use of situation- and species-specific score sheets which document physiological and / or behavioural variables.

He concludes with a recommendation that animal welfare knowledge be better shared within the veterinary profession, particularly regarding the use of analgesics.

Guidelines on transgenic animals

The Canadian Council on Animal Care (CCAC) in 1997 published a nine-page information booklet on this very topical subject. The guidelines are provided to assist animal ethics committee members and investigators in evaluating the ethical and technological aspects of the proposed creation, care and use of transgenic animals.

The booklet describes briefly how transgenic ani-

mals are created and the purposes for which they are used. It also addresses the ethical concerns raised and includes a bibliography of 50 references.

Copies are available free of charge from ANZCCART's Adelaide office.

More on transgenic animals

The journal *Lab Animal* (September, 1997, Volume 26 (8)) includes five papers about transgenic animals.

- "The history and theory of transgenic animals", by C.A. Pinkert;
- "The production and verification of transgenic mouse strains", by G. M. Monastersky and J.G. Geistfeld;
- "Studying the developmental regulation of the human β -globin locus in transgenic mice", by C.H. Clegg et al.;
- "Resource: guidelines for naming transgenic mice", by M.T. Davisson; and
- "Individually ventilated microisolation cages", by G. Novak.

"Vetbase 2.1 for Windows" A database with veterinary dosages for non-antibiotic drugs

by JD Juiper and HJ Kuiper

ISBN 90 803346 2 6

Price: \$US225

Vetbase contains information on more than 800 drugs for use in over 130 animal species, including all laboratory and

domestic animals, zoo animals, fish, birds, amphibians and reptiles.

Over 12,000 dosages are listed and about 4,500 of these refer to pain and anaesthesia. The database is easy to use, with built-in search commands. The user selects an animal species and a specific drug (e.g., ketamine, ivermectin) or pharmaceutical class (anaesthetics, analgesics, antiparasitics) and if desired, route of administration. The information that is retrieved from Vetbase includes the drug name, dosage(s), route of administration, notes on use and literature references.

The classification system of drugs in Vetbase is an adapted version of the Anatomical Therapeutic Classification System for veterinary medicinal products. The first level of this classification is anatomical (the site of action) and the second level is based on the therapeutic and chemical characteristics.

Minimum requirements for using Vetbase are:

- Windows 3.1 or Windows 95;
- 15 Mb free space on hard disc;
- Intel 386 microprocessor;
- 520K RAM.

A demonstration version is available on the Internet at: <http://oslovet.veths.no/data/basesintro.html#vetbase>

For further information and orders contact: Hajeka Informatie and Advies, Graafschap 7, 3524 TL Utrecht, The Netherlands. Tel / Fax 31 30 289 42 51.

Book Reviews

Veterinary Medicine – an illustrated history

by Robert H. Dunlop and David J Williams. Mosby, St Louis. ISBN 0 8016 3209 9
Price: \$150.00

This magnificent 700 page opus has been written for all who are interested in the veterinary profession in its broadest sense. Its twin goals are to inform veterinarians, present and future, of the historical roots, ethos and achievements of veterinary medicine and to educate the public about animals, their interaction with humans and their roles in the history of science and culture.

Professor Robert Dunlop was Foundation Dean of the School of Veterinary Studies at Murdoch University in Western Australia and currently holds the Chair of Veterinary Public Health at the University of Minnesota. His co-author, Professor David Williams, is an art researcher and historian at Purdue University School of Veterinary Medicine.

The 33 chapters cover an enormous range of topics, including the history of human-animal interaction from Palaeolithic times, through the transition from hunting to domestication of livestock up to the present time.

Magnificently illustrated, with over 500 fascinating photographs and drawings, most in colour, the book is encyclopaedic in its breadth of subject material. This is particularly true of the chapters dealing with the evolution of veterinary medicine through Asia, Greece, Rome

and Arabia and in Europe in the Dark and Middle Ages. This leads to a chapter detailing the establishment of the present veterinary schools in Europe, with the world's first opening at Lyons in France in 1761. The principal reason for its foundation was to treat the diseases of livestock, especially horses. Other early veterinary schools established in France were at Alfort, Toulouse and Nantes.

The Austro-Hungarian Empire soon followed, with the opening of a veterinary hospital and school for horse medicine and surgery in Vienna in 1766. The first English speaking veterinary school was established in London in 1791. This was followed in 1823 by the foundation by William Dick of the Edinburgh Veterinary School and veterinary schools in Canada (Toronto, 1862) and the USA (Cornell, 1868).

The following five chapters describe the gradual unravelling of the causes of most of the common animal diseases, associated with the development of the new sciences of bacteriology, virology and parasitology.

The last third of this fascinating book covers the emergence of modern science, from Darwin's Theory of Natural Selection, to the development of biomedical science. This includes discussion of veterinary roles in early anatomy, physiology and veterinary public health.

Perhaps the most relevant section to readers of this newsletter is the second-last chapter 'Bioethics, Animal Experimentation and Sentience'. Illustrated profusely, it includes the classic series of engravings by William Hogarth, *The Four Stages of Cruelty*. The authors describe the development of the modern experimental method from Francis Bacon and René

Descartes to the present. This includes discussion of anthropocentric and utilitarian philosophies in Europe in the eighteenth and nineteenth centuries, leading to the formation of the SPCA (later RSPCA) in London in 1824. The first legislation addressing vivisection was passed in the UK in 1876.

The French physiologist Claude Bernard is commemorated by a painting of him dissecting a rabbit. Bernard published *An Introduction to the Study of Experimental Medicine* in 1865, which integrated studies in histology, anatomy, physiology, biochemistry and pathophysiology. The work of Bernard, his teacher Magendie and Louis Pasteur, "led the public to a widespread expectation that animal experimentation would lead to important progress in understanding the function of the body and the treatment and prevention of diseases".

The discussion leads to the efforts of Marshall Hall during the first half of the nineteenth century to establish principles for humane animal experimentation and to minimise animal pain. It covers the development of the modern sciences of physiology, pharmacology and pathology, particularly comparative pathology. The reader experiences a sense of *déjà vu* when reading of claims published in 1875 in a British newspaper that none of (Claude Bernard's) experiments was justifiable and that their primary goal was to get ahead of one's contemporaries in science, even at the price of an incalculable amount of torture.

This chapter includes an erudite and interesting history of the antivivisection movement in the UK in the latter part of the nineteenth century. This leads to a discussion of the initiation of

United States animal welfare societies, commencing with the Society for the Prevention of Cruelty to Animals in New York in 1866.

Veterinarians played leading roles in the development of the new field of laboratory animal science in the USA. The National Academy of Sciences developed its Institute of Laboratory Animal Resources (ILAR) in 1953 and in 1963 the National Institutes of Health (NIH) published a *Guide for Laboratory Animal Facilities and Care*. Laboratory animal medicine was recognised as a speciality by the American Veterinary Medical Association in 1957. In 1966, the US Congress passed the Laboratory Animal Welfare Act (now known as the Animal Welfare Act), the first law to offer protection to laboratory animals in the USA. The Canadian Council on Animal Care (on which ANZCCART was to some extent modelled), was established in 1968.

The last part of this chapter considers the moral questions raised by animal experimentation – what criteria make it justifiable or unjustifiable? Have the gains in knowledge and improvements in human and animal health been worth the cost to the experimental animals? How can the moral value of non-human animals be quantified?

This fascinating book ends with a consideration of how veterinary science has evolved from 1761 until the present day.

I will treasure this work and look forward to spending winter nights delving in its historical descriptions and admiring its artwork.

Robert Baker
Executive Officer



ANZCCART Workshop on Monoclonal Antibody Production

Since the note in the last issue of ANZCCART News about forthcoming workshops, the Board, at the suggestion of the NHMRC, convened a workshop on the *in vitro* production of monoclonal antibodies. This was held at the Walter and Eliza Hall Institute of Medical Research in Melbourne on 18 March and was attended by 34 persons, drawn from industry, government, research institutions, universities and animal welfare organisations.

The workshop was very positive and achieved its three major goals:

- to provide the basis for a draft policy on this subject by the NHMRC;
- to help participants gain a better understanding of the issue and of each others' position; and
- to improve the welfare of the experimental animals.

Other ANZCCART workshops in 1998

The second workshop will be held at the University of Adelaide on Thursday, 28 May on the Sources of Animals for Research and Teaching. It is open to all interested persons and the program is currently being prepared. It will be followed by a meeting of the Board and the 1998 AGM at the same venue on 29 May.

The third workshop will be held on Monday, 21 September in Melbourne, prior to the 1998 ANZSLAS Conference. The

topic is likely to relate to monitoring of the health of experimental animals. It will be sponsored jointly by ANZSLAS.

The number of animals used for experimentation in Australia and New Zealand

Until the new statistics package for animal use in research and teaching in Australian States and Territories is fully utilised (see ANZCCART News 10(3): 1), it is not possible to obtain national data.

Mr Keith Edwards, a member of the NSW Animal Research Review Panel, has published the most recent data from Victoria, NSW, SA, Tasmania and WA, in the February - April 1998 issue of *Animals Today*. Queensland, the NT and ACT do not publish these data. The total animals used for the five States in one year was 3,176,174, which included 2,035,533 fish. The total excluding fish was 1,140,641 animals. It is not currently possible to compare data directly between the States, due to different methods used to prepare the data and because of different regulations relating to their preparation. For example, the Victorian data do not include fish and do not differentiate between amphibians and reptiles.

The data from New Zealand are published in the Annual Report of the National Animal Ethics Advisory Committee, available from the Ministry of Agriculture and Forestry, Wellington. The 1996 Annual Report lists a total animal usage of 264,516, including 17,002 fish.

Coming up

American College of
Laboratory Animal
Medicine (ACLAM) Forum
3-4 May 1998
Illinois, USA

Concort, Dr Charles
McPherson, Executive
Director, ACLAM
200 Summerwind Drive
Cary, NC 27513, USA
Tel: 919 851 3122
Email: csmc@chcnet.com

Australian Veterinary
Association Annual
Conference
19-22 May 1998
Concort, Dr Michael
Gallagher, AVA
7 Hampden Place
Sydney, NSW 2000
Tel: 02 923 2222
Fax: 02 923 2223

AAVLA 12th Annual
Conference
20-23 May 1998
Concort, Dr Michael
Gallagher, AAVLA
10000 Wilshire Blvd
Beverly Hills, CA 90212
Tel: 310 276 1234

Biology of Animals
Conference
10-12 August 1998
University of Guelph
Concort, Dr Michael
Gallagher, Biology
Department, 50
University Avenue
Guelph, ON N1G 2W1
Canada

Endocrine Society of
Australia / Australian
Society for Reproductive
Biology Conference
24-25 August 1998
Concort, Dr Michael
Gallagher, Endocrine
Tel: 08 9346 1490
Fax: 08 9346 1222

In vitro 75
10th International
Workshop on In Vitro
Toxicology
14-18 September 1998
Winchester, UK
Concort, Dr Diane Bedford
School of Biological
Sciences, University of

Warwick, CV4 7AL, UK
Tel: 01454 533333
Email: d.bedford@warwick.ac.uk

Australian and New
Zealand Society for
Laboratory Animal Science
22nd Annual Conference
21-23 September 1998
Concort, Dr Michael
Gallagher, ANZSLAS
10000 Wilshire Blvd
Beverly Hills, CA 90212
USA

Australian Society for
Animal Welfare
23-25 September 1998
Concort, Dr Michael
Gallagher, ASAW
10000 Wilshire Blvd
Beverly Hills, CA 90212
USA

Animal Welfare
Conference
23-25 September 1998
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Gallagher, Animal
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Welfare
10000 Wilshire Blvd
Beverly Hills, CA 90212
USA

Australian Society for
Immunology Conference
23-25 September 1998
Concort, Dr Michael
Gallagher, ASIm
10000 Wilshire Blvd
Beverly Hills, CA 90212
USA

Animal Welfare
Conference
23-25 September 1998
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Gallagher, Animal
Welfare
10000 Wilshire Blvd
Beverly Hills, CA 90212
USA

News

New regulation for gene technology in Australia

The Federal Government has decided to introduce a package of measures designed to provide appropriate regulation of gene technology. In a joint press release by the Ministers for Primary Industry, Environment and Science, the three Ministers responsible said that the Government will:

- amend current legislation and introduce new legislation to ensure that gene technology is covered by uniform laws and that compliance is compulsory;
- establish a Gene Technology Office to administer a national regulation system which will ensure that comprehensive scientific analysis and risk assessment are undertaken before genetically modified organisms (GMOs) are released. (The office will coordinate the release of GMOs by existing bodies, make decisions on release of GMOs not covered by existing bodies, and regulate gene technology research);
- establish consultations with, and a communication plan for, the public and the State and Territory Governments; and
- as an interim measure, establish a Gene Technology Liaison Committee to provide advice on urgent issues which are

not able to be addressed under current regulatory systems.

The main commercial applications of gene technology work are in the fields of pharmaceutical and agricultural products.

Some types of genetically modified products are not addressed by current legislation which covers agricultural and veterinary chemicals and pharmaceutical products. Also, compliance with current gene technology regulation is voluntary. The Government's measures will ensure that all gene technology is covered by legislation.

A number of therapeutic techniques and pharmaceuticals based on gene technology are already being used by Australian consumers. Gene technology in agriculture has the potential to bring about significant changes in production systems and markets. This could lead to reduced costs to producers and consumers, increased sustainability of agricultural enterprises and improved safety, quality and variety. It could also lead to a reduction in the use of insecticides, use of more environmentally friendly chemicals, and to less damage to crops during transport and storage.

Conference on the biology of animal stress and the implications for animal well-being

This will be held at the University of California, Davis, USA from 16 - 19 August, 1998 and

is to be sponsored by the College of Agricultural and Environmental Science, UC Davis, the Center for Animal Welfare, UC Davis and the US Department of Agriculture.

It will include four general sessions:

- biology of the stress response;
- impact of long-term stress on animals;
- cognitive and developmental aspects of stress; and
- alleviating animal stress.

The Organising Committee is chaired by Professor Joy Mench, from UC Davis and includes Professor Paul Hemsworth, from the Animal Welfare Centre in Melbourne (see *ANZCCART News*, 10(4): 4). Information can be found on the conference web site (www.aes.ucdavis.edu/AnStress.html) or by email at AnStress@agdean.ucdavis.edu.

Proceedings of ANZCCART's 1997 Conference are now available

This conference on *Ethical Approaches to Animal-based Science* was held in Auckland in September, 1997, and was jointly sponsored by ANZCCART and NAEAC.

Edited by D. Mellor, M. Fisher and G. Sutherland, the 160-page Proceedings will be valuable to anyone interested in the place of ethics in science. Animal-based scientists, including researchers, teachers and students, will find it particularly relevant, as will all others concerned about animal welfare, emerging environmental pressures as they affect animal welfare, the effectiveness of AECs and the promotion of humane practices in our use of animals in science.

The Proceedings are now available from ANZCCART's offices in Adelaide (\$A30) and Wellington (\$NZ35), price includes postage within Australia and New Zealand.

ANZCCART News is published quarterly by the Australian and New Zealand Council for the Care of Animals in Research and Teaching Limited.

It is a publication for researchers and teachers; members of animal ethics committees; staff of organisations concerned with research, teaching and funding; and parliamentarians and members of the public with interests in the conduct of animal-based research and teaching and the welfare of animals so used.

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