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# CHAPTER 18

## The RAAT Project: Alternatives to using animals in research

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### Abstract

One of the hidden pockets of animal cruelty in Western culture is in the scientific laboratories that use animals in experiments. Currently there are about 6 million animals used in experiments each year in Australia (Singer 2009). The vision of the Replace Animals in Australian Testing (RAAT) project is to reduce the number of animals used in scientific experiments and medical research in Australia. We are developing a network of researchers and other individuals or groups interested in advocating non-animal based research and in strengthening the Australian Government/NHMRC guidelines for animal testing. In 2008 we launched the RAAT website <http://www.uow.edu.au/arts/research/raat>, which is an information resource on replacement technologies for animal testing. Achieving advances in alternatives to animal testing requires a change in both scientific and social attitudes as well as promoting new and innovative research approaches and technologies. We are exploring ways forward in communicating and developing RAAT.

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### Introduction

Human relationships with animals can foster a high quality of life particularly where there is an attitude of respect and care, together with a concern about the well-being of the animal. Some human/animal relationships undermine our quality of life, if, for instance, we engage in cruel practices. We are moral beings and hence we are affected by judgements of immorality. This can extend to an ethical concern about living in a society that condones animal cruelty even if we are not directly responsible for it. When, for example, the nature and extent of factory farming is revealed, many people find that their participation in these practices through the consumption of meat is intolerable. One of the hidden pockets of animal cruelty in Western culture is in the scientific laboratories that use animals in experiments.

In a recent article Jasmijn de Boo and Andrew Knight cite the latest worldwide estimated figures on animal use in toxicity testing, biomedical research and education as being more than 58 million “living non-human vertebrates” (De Boo & Knight 2008). They refer to survey data which shows that within the government, academic and commercial sectors there is considerable resistance to using available replacement technologies. Other surveys undertaken in the USA have revealed a widescale non-compliance to the *Animal Welfare Act*

requirement on using alternatives; in particular an “inadequate consideration of alternatives” and “unnecessary experimental duplication” (De Boo & Knight 2008, p.111). Both the extraordinarily high figures of animal use and these survey results, “demonstrate marked and widespread deficiencies in awareness of the potential and availability of non-animal methods” (De Boo & Knight 2008, p.112).

Currently there are about 6 million animals used in experiments each year in Australia (Singer 2009). The animals used include horses, cows, mice, rabbits, dogs, monkeys, chickens, sheep, rats, guinea pigs and dunnarts. While there is an attempt in some cases to ‘enrich’ the caged environment, e.g. with toys and music, the animals are quite simply in gaol. They are often over-crowded, or the reverse – stripped of any social contact with their kind. They never see the sun. Facilities are hidden so that they don’t become the targets of activists. While there is an attempt by some researchers in some experiments to use fewer animals than previously, with the rising interest in genetic engineering, an increase in the total number of animals used is predicted. Scientific research and teaching has an entrenched culture of using ‘lab animals’ as a source of authority and proof. As well, secrecy about, and the scale of, animal use is heightened by commercial interests which insist on confidentiality, so that many experiments are repeated over and over, around the world.

Animal experimentation, in Australia, does not operate in an entirely unregulated environment. The principle of the 3Rs – Replacement, Reduction and Refinement – developed by W.M.S. (Bill) Russell and R.L. Birch in 1959 (Russell and Birch 1959) informs various laws, codes and committee briefs. However, as in all relationships between ethics and social regulatory frameworks, the way in which these principles are enacted is highly variable and subject to cultural influences and changing attitudes. The reliance on laboratory animals for science and medicine can be challenged not only on the grounds of changing social attitudes to its acceptability, but also on the basis of rapidly developing new technologies that can deliver alternative or replacement approaches. The Replace Animals in Australian Testing (RAAT) project is a partnership between two researchers in the Faculty of Arts at the University of Wollongong: Denise Russell, a philosopher with a background in ethics; and Melissa Boyde, a researcher in the fields of animal studies and literary and visual culture. They share a commitment to animal welfare and rights. In devising the RAAT initiative they decided to address the issue of replacement of animals in scientific and medical research – which was specifically informed by Russell’s experience on the University of Sydney Animal Ethics Committee.

### **Background**

For many years Russell was concerned with the treatment of animals in factory farming and zoos. She was concerned too about animal experimentation but found it difficult to find out what was happening in this area in Australia. As a lecturer in the Philosophy Department at the University of Sydney in the 1980s she began courses entitled ‘Humanity and Animality’, examining the attempts made to distinguish humans from animals and also encompassing animal ethics. She sought out sources of information on animal experimentation and was appalled at what she found.

Russell was asked to become an independent member of the Animal Ethics Committee at the University of Sydney in 1994, and she joined in the belief that she could find out more about animal experimentation and possibly help some animals. She discovered that there was no possibility of debating ethical issues beyond questions concerning the number of animals

used and whether they could be anaesthetised or not. She describes some of her experiences while serving on that Ethics committee:

There was never any discussion about whether the value of the possible experimental outcome justified the harm done to animals in the experiments. I tried to get such a discussion going concerning experiments with dogs where they were given random electric shocks, appeared to just give up on life, and refuse to eat. This was put forward as a model of anorexia nervosa in humans. One of the committee members said to me: “if you object to this what will you do with my research proposal which is coming up at the next meeting on the same line of research. Would you object to that too?” (said with a laugh). I said “yes”. The chairperson then told me there was no ground for objection as this was a reputable area of research because other people had published papers about it. I wondered then whether the job of the Ethics Committee was just to rubber-stamp the status quo. In fact in the years since the committee has been meeting no research proposal had ever been rejected, though some had been sent back for modification.

The researchers were required to note whether the proposed experiment was useful for humans or not. Some experimenters ticked a ‘yes’ box when asked if the experiment was useful to humans when it quite clearly was not, e.g. one research project concerned a beak disease in parrots. When I objected that the responses are often put down in a cynical or jocular vein I was told by the Chair: “there is a need to maintain a sense of perspective in all matters”.

I was deeply shocked by my experience on this committee. Over the years since that time I have discussed various Animal Ethics Committees with other independent members (often philosophers) and members from animal protection organisations. The situation has not changed. Research proposals are not rejected outright, and although the scientists may be asked to trim the edges, there is no discussion of non-animal alternatives.

Members are required to sign a confidentiality agreement so that the general public is kept in the dark about how many experiments are conducted, what animals are used, how they are sourced, the pain and distress inflicted on research animals, the number of animal deaths and so on. There is little or no monitoring of research. The overseeing committees are called ‘Ethics Committees’ and so it sounds as though any issues that may be ethically problematic would be dealt with, but from my experience, and the experience of my colleagues on Ethics Committees at other Australian universities, this is most definitely not the case.

### **The rules**

Scientific and medical research using animals in Australia is regulated by the Australian Government National Health and Medical Research Council: *Australian code of practice for the care and use of animals for scientific purposes (NHMRC Code)* (National Health and Medical Research Council 2004).

One of the purposes of the Code is:

To promote the development and use of techniques that replace the use of animals in scientific and teaching activities (NHMRC Code p.1).

One of the general principles of the Code is:

Replacement Clause 1.8 Techniques that totally or partially replace the use of animals for scientific purposes must be sought and used wherever possible (National Health and Medical Research Council 2004 p.6).

Institutions that use animals for scientific reasons are required to establish an Animal Ethics Committee (AEC) directly responsible to the governing body of the institution. This committee is supposed to ensure, on behalf of the institution, that all care and use of the animals is conducted in compliance with the Code, including applying the Replacement principle. The AEC receives applications to conduct research and in their terms of reference in the Code is the stated aim to:

approve only those studies for which animals are essential and justified and which conform to the requirements of the Code. This should take into consideration factors including ethics, the impact on the animal or animals and the anticipated scientific or educational value (National Health and Medical Research Council 2004 p.10).

Researchers are required to fill out a proposal form, including a section on Replacement, which should provide an explanation of why animals are needed for the project, including:

- a list of any potential alternatives to animal use
- whether any of these alternatives would be used, and if not
- why alternatives are unsuitable (National Health and Medical Research Council 2004 p.15).

When planning a project, and before submitting a proposal to the AEC, researchers are required to consider “can the aims be achieved without using animals?” (National Health and Medical Research Council 2004 p.22). The “Guidelines to Promote the Wellbeing of Animals Used for Scientific Purposes” were published in 2008 (National Health and Medical Research Council 2008) to be used in conjunction with the Code. Like the Code the guidelines clearly state that:

if a viable alternative method exists that would partly or wholly replace the use of animals in a project, the Code requires investigators to use that alternative. Examples of alternative methods include in vitro techniques and computer models (National Health and Medical Research Council 2008 p.4).

The first point listed in the “Checklist for Promoting Animal Wellbeing” is the planning requirement that the researchers “determine whether alternative, non-animal techniques could be used” (National Health and Medical Research Council 2008 p.49).

The problem of animal experimentation is not so much that the regulations and guidelines are weak, rather it is that they are not carried through into practice. In his summary of the Code and state and territory laws relating to the use of animals in research and teaching, Malcolm Caulfield concludes that “the regulation and oversight of animal welfare in research and teaching is fragmented and poorly coordinated” (Caulfield 2008, p.162). He suggests the need for national laws to create “uniformity regarding implementation and enforcement” (Caulfield 2008 p.162), and he also points out that at present the Guidelines “will not have legal effect (for example, unless they are picked up by references in the relevant State and Territory legislation)” (Caulfield 2008 p.161). In addition, he suggests the need for national

reporting of statistics since currently “there is no centralised agency responsible for collating and publishing data on animal use in research and teaching” (Caulfield 2008 p.161).

The latest (2007-2008) annual report of the NSW Department of Primary Industries Animal Research Review Panel (NSW Department of Primary Industries, 2009) does not provide total figures for the use of animals in research in the state of NSW but from our calculations (based on the DPI’s Animal Research Review Panel’s figures) it appears that the approximate total number of animals used in research in that period is 8.5 million.<sup>1</sup> This figure is broken into the categories of purpose of use and type of procedure.

Category 1 *Observation involving minor interference* accounts for 7.7 million animals. This figure includes observation of free-living animals in the wild such as birds. Deducting the total number of animals in this category leaves approximately 800,000 animals used in experiments in the remaining categories.

The following provides approximate figures of animal use in each category:

- Category 2 *Animal unconscious without recovery* totals approximately 130,000 animals including 6,120 dogs, 439 cattle, 57 horses, 749 pigs and 5 marmosets.
- Category 3 *Minor conscious intervention* uses 458,249 animals including sheep, mice, poultry, rats, rabbits, horses, goats and cattle.
- Category 4 *Minor surgery with recovery* uses 24,236 animals including horses, pigs, sheep, mice and native captive animals.
- Category 5 *Major surgery with recovery* uses 12,482 including cats, sheep, baboons, pigs and mice.
- Category 6 *Minor physiological challenge* uses 101,864 animals including poultry, dogs, sheep and mice.
- Category 7 *Major physiological challenge* uses 16,017 animals including rats, mice, cattle, poultry, horses, sheep and rabbits.
- Category 8 *Death as an endpoint* uses 26,317 animals including mice, rats, sheep, rabbits, native wild and captive animals and deer.
- Category 9 *Production of genetically modified animals* uses a total of 4,374 animals – all mice.

The figures can be broken down into further categories of purpose such as Research – Human or Animal Biology and Research – Environmental Study. The Education category shows a very high use of animals – over 1.1 million animals. The majority of these animals were used in Category 1 and include native mammals, exotic feral animals, birds, domestic animals and so-called laboratory mammals. But there are also significant numbers of animals used in Categories 2-6.

Two recent examples of animals used for teaching purposes indicate that some of the animals used were in experiments that were unnecessary because replacement technology was available and/or the experiments were not vocationally necessary.

According to the Monash University student-developed website *Monash Kills* (<http://www.monashkills.org/site/>) “behind closed doors at Monash University, students are being instructed that cruel treatment of animals is just routine lab work. The *Monash Kills*

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<sup>1</sup> This figure includes animal re-use so one animal can be counted more than once (NSW Department of Primary Industries, May 2009, p.31).

campaign has secretly filmed the shocking mistreatment of animals by staff and students at Australia's largest university".

The website, created by concerned students, reports that:

Undergraduate science students are not training to be vets or surgeons. But in a lab class, physiology students perform throat dissections on live rabbits. These thinking, sentient animals are anaesthetised and tied down by their teeth and limbs to a steel slab. Undergraduate students, with no experience in surgical technique, are instructed to cut open the rabbits' throats using unsterilised instruments. Upon exposing the throat cavity, students perform procedures to measure the animals' heart rate and pulse. They administer intravenous noradrenaline to speed up the rabbits' hearts, and glyceryl trinitrate to lower blood pressure. Our footage shows a rabbit breathing faster in response to drugs administered through their throat. When the students leave to get a snack after class, these defenseless animals are killed and thrown into a plastic garbage bin ... Professor RH Day (Chair of the Monash Animal Welfare Committee) admits that there are humane non-animal alternatives available to these students which do not disadvantage them in any way.

As a direct result of this student-led campaign Monash University announced that live rabbit dissections would not take place in 2009.

Another example of the unnecessary use of animals comes from Jacqueline Dalziell, Project Co-ordinator at Animal Liberation's Sydney office (2009). Dalziell was contacted by a concerned 2nd year psychology student at the University of Sydney in regards to the 'meaningless use of animals' in her course. Dalziell accompanied her to one tutorial, called 'Brain and Behaviour'. The tutorial consisted of one rat per 2 students, the rats being encased in plastic observation cages. Half the rats were given sucrose water (10% sugar and water) and the other half Tooheys Old beer; they had been deprived of water for over a day to provoke them to drink unusual substances which they normally would not. The class consisted of observing whether the rats would realise that if they pressed on the lever, they would receive either sucrose water or beer as a result. There were no conclusive trends at the end of the tutorial to point to whether the rats preferred one drink over the other, and the purpose of the experiment or the data was not touched upon. Most of the class engaged in jokes about the drunk rats and did not take the class seriously, nor did they handle the rats properly. The rats had been used in other experiments that week, and were returned to cages which housed six large rats each. According to Dalziell the rats were to be used in one or more further experiments before being killed.

These case studies and the figures from the NSW DPI figures strongly indicate that it may now be the time to reconsider if the 3Rs (Replacement, Reduction and Refinement) is the best philosophical model for the protection of animals in the current environment of medical and scientific research and university teaching.

### **The RAAT Symposium**

In 2008 Boyde and Russell held a Symposium at the University of Sydney to discuss what could be done. They created a website to act as an information base on alternatives to using animals in Australia. For the Symposium and the website they received support from the Australian Association of Humane Research (AAHR), Medical Advances Without Animals (MAWA), the Don Chipp Foundation and the University of Wollongong.

Thirty animal advocates, lawyers, researchers and philosophers known to share an interest in this area were invited and asked to direct their attention to two questions:

1. How to get over the impediments to using alternatives to animals in scientific and medical research?
2. What practical strategies can be used to promote alternatives to using animals in scientific and medical research?

The question of impediments to using alternatives highlighted several key areas of concern:

### **Legal issues**

There is a lack of national consistency in the law, including a lack of consistency in the definition of ‘animal’. In the Symposium, Jason Grossman, an ethics philosopher and at the time a member of the NSW Department of Primary Industries Animal Research Review panel, pointed out that:

all states and territories have an act which covers animal welfare or prevention of cruelty. Animal research is also covered through these acts, but in various and inconsistent ways. The great variations in different State laws means that in some cases wildlife research is quite heavily regulated, for example in NSW where the use of animals in education is also regulated, but in other states it is not (Grossman 2008).

Katrina Sharman, Corporate Counsel for ‘Voiceless’, the fund for animals, outlined the legal impediments to the protection of animals used in experiments:

Arguably the greatest legal issue is the classification of animals as property. This means that they are entirely at the mercy of humans with no right to life, freedom or bodily integrity. We can do what we like to them, subject to animal welfare laws. But the law is a shield for the use of animals for scientific purposes – for those who want to burn, gas, mutilate, infect and poison animals, provided such acts can be justified and conform to animal welfare laws. Although such acts constitute criminal offences elsewhere, the law provides a ‘get out of gaol free card’ for animal researchers (Sharman 2008).

The other members of the legal panel pointed out that the widely-held belief that there is an actual legal requirement to use animal models to get research approved or commercialised is a myth. Consideration of the current law shows that there are no legal impediments to protecting animals by using alternatives.

### **Problems in functioning of the AECs**

There is a (reasonable) assumption by some members of the public that because animal research is regulated and that ethics committees exist that any ethical concerns they may have are addressed adequately. However, there are inherent weaknesses in Animal Ethics Committees, the bodies designed to implement the Code of Practice. These include, but are not limited to, issues such as confidentiality agreements which create a major lack of transparency. In many reported cases it can also be difficult for the animal welfare representatives or independent members on the committees to get an understandable translation of the scientific protocol under discussion. There is also a lack of adequate enforcement systems for committee decisions. A further major issue reported from experience on ethics committees is the fact that ethical debate does not take place and that



instead the focus is on procedure. There is no real possibility of challenging decisions on ethical grounds.

At the Symposium the Executive Director of Animals Australia, Glenys Ooyges, provided insights from her experience serving on a number of ethics committees:

Clearly the directions of the Code are quite good and meet broad community expectations, despite a few weakly worded points. But of concern is the rising number of animals being used in research. Ethics committees operate on the assumption that the research using animals will go ahead unless there is a very strong reason to prevent it – the decision-making process of ethics committees is back to front (Ooyges 2008).

It is clear that the fundamental issue is one of social change: the culture which assumes that animal experimentation is justified for almost any scientific purpose and which allows animals to be regarded as property must be reviewed.

### **Practical strategies**

From the second question – practical strategies to promote alternatives – several ideas emerged:

#### **Information resources**

- make information on alternatives available to ethics committees
- implement a system where researchers and AECs are notified when alternatives become available
- build up information on alternatives, e.g. through the RAAT website: <http://www.uow.edu.au/arts/research/raat>, MAWA initiatives, the AAHR information bank, and the DPI database on potential alternatives
- create a centre on alternatives to research and disseminate findings, and provide information on funding options, prizes etc.

#### **Ethics committees' procedures and processes**

- work on strengthening the Code so that more account must be taken of alternatives in protocols. Reverse the assumption in the Code that animals are to be used. Mandate the use of non-animal models in some testing
- enhance the transparency of decisions
- develop concrete ways to work through ethical issues so that low-value research can be rejected
- allow committee members to get advice about protocols
- mount test cases to challenge the validity of choice about not using alternatives.

#### **Educator/student/emerging researcher awareness**

- help undergraduate students to object to animal experimentation in their courses by providing information on available alternatives
- develop presentations for incoming doctoral students in science and medicine to raise their awareness of ethical issues
- provide information for researchers to consider alternatives
- work for the elimination of all use of animals in teaching (except for very clear vocational needs). There is no national uniform approach to this.

### **Legal**

- lobby for national legal coverage of animal welfare and animal interests and a legislative review of the law in relation to animals. Standardise the definition of ‘animal’ across states and territories. Reject the notion of animals as property
- use freedom of information to find out about committees’ deliberations
- create a tax on animals used in research which could be used to develop alternatives.

### Network for advocacy

- foster dialogue between the community and the research community, including using the media
- publicise test cases and articles on alternatives which could then lead into public meetings
- form links between the various groups representing animal interests to develop joint campaigns
- build formal and informal networks/partnerships between groups representing animal interests, government representatives and members of the research community.

### Initiatives since the Symposium

In 2009/10 colleagues from the RAAT Symposium have developed some significant initiatives and changes:

- Dr Malcolm France, Head of Laboratory Animal Services at the University of Sydney, reports that the University of Sydney is significantly upgrading the resourcing of its Animal Ethics office. This includes creating three new positions: a veterinarian, a person with technical experience in animal ethics, and a Director of Research Integrity. An important role of the members of this new team will be educating researchers and AEC members to help ensure the effective implementation of the Code of Practice. Another change is the introduction of shorter terms for AEC members since membership of the Committee is seen as an important way of educating all stakeholders in the animal ethics arena. AEC meetings will also be attended by a total of five veterinarians (the Code requires only one vet to be on an AEC). In addition, the University is offering a prize to the researcher whose work has shown the most potential to replace or reduce animal use (France 2009).
- Medical Advances Without Animals (the MAWA Trust) announced three year funding for a Senior Research Fellow to assist in the establishment of the Australian Centre for Alternatives to Animal Research (ACAAR) at the Australian National University (ANU). The aim of ACAAR is to “facilitates the development and utilisation of non-animal based experimental methodologies to replace the use of animals in medical research” (MAWA 2010). MAWA continues to offer two Doctoral Research scholarships each year, a number of Honours Research scholarships (which includes financial support to the host laboratory for the student’s research project), other Research grants and conference scholarships. A current recipient of MAWA funding, Dr Brett Lidbury, argues that “the culture has just become obsessed with the mouse model, or the rat model, or whatever animal, and with the modern pressures of research, of getting funding, of getting papers published, there just isn’t the latitude to try new things” (*The Newcastle Herald*, July 18, 2009, p.A7). Lidbury’s MAWA-funded research at the University of Canberra, in conjunction with Canberra Hospital, will mine existing pathology data held by the hospital with the view of future access to patient’s blood samples for detailed genetic research on predisposition to certain diseases – “rather than doing that in a mouse we are going to start profiling humans” (*The Newcastle Herald*, July 18, 2009, p.A7).

## RAAT

Throughout 2009/10 we informed animal protection organisations throughout Australia about the project and as a result have now linked many of these organisations to the RAAT website. As well we notified all Animal Ethics Committees in universities about the existence of the website and received positive responses from several including the University of Melbourne, Edith Cowan University, the Queensland University of Technology, La Trobe University and the ANU. We were approached by the media for interviews and information after the release of the latest Animal Research Review Panel report. These media reports have led to enquiries from the public and from medical students who are concerned about the number of animals used in research in Australia. We have also presented on the topic at conferences and in the *Festival of Dangerous Ideas* at the Sydney Opera House.

We envisage that our work will continue into the future. The RAAT website (<http://www.uow.edu.au/arts/research/raat>) will be regularly updated and we will continue to foster a network of concerned people to push for alternatives in various ways.

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## References

*Animal Welfare Act*, 1966, United States of America.

De Boo, J & Knight, A 2008, 'Increasing the implementation of alternatives to laboratory animal use', *Alternatives to Animal Testing & Experimentation (AATEX)*, vol.13, no.3, pp.109-117.

Caulfield, M 2008, *Handbook of Australian Animal Cruelty Law*, Animals Australia, North Melbourne.

Daziell, J 2009, personal communication

France, M 2009, personal communication

Grossman, J 2008, accessed 25/7/2010,  
<http://www.uow.edu.au/arts/research/raat/events/index.htm>

*Medical Advances Without Animals (MAWA)* 2010, accessed 27/7/2010, [www.mawa-trust.org.au/about.html](http://www.mawa-trust.org.au/about.html)

*Monash Kills* 2010, accessed 15/2/2010, <http://www.monashkills.org/site>

National Health and Medical Research Council 2004, *Australian code of practice for the care and use of animals for scientific purposes*, 7<sup>th</sup> edition, Australian Government, Canberra.

National Health and Medical Research Council 2008, *Guidelines to Promote the Wellbeing of Animals Used for Scientific Purposes: The Assessment and Alleviation of Pain and Distress in Research Animals*, Australian Government, Canberra.

NSW Department of Primary Industries, May 2009, Animal Research Review Panel, New South Wales, *Annual Report 2007-2008*.

Ooyges, G 2008, accessed 25/7/2010,  
<http://www.uow.edu.au/arts/research/raat/events/index.htm>

*Replace Animals* website, accessed 25/7/2010, <http://www.uow.edu.au/arts/research/raat>

Russell W.M.S and Birch R.L 1959, *The principles of humane experimental technique*, Methuen, London.

Sharman, K 2008, accessed 25/7/2010,  
<http://www.uow.edu.au/arts/research/raat/events/index.htm>

Singer, P 2009, *Minding Animals Conference*, Newcastle, Australia, July 2009.