ETHICS, CONFLICT AND ANIMAL RESEARCH

Andrew Brennan

Introduction

The three Rs of Russell and Burch - Reduce, Replace, Refine - are widely agreed maxims of animal-based science. The morally-concerned researcher tries to reduce both the number of animals used in science, and the impacts of procedures on them. Animals are to be replaced, wherever possible, by techniques that do not use animals. Techniques and procedures are to be refined as much as possible to minimise harms. Implementing these maxims is desirable given that much animal-based science seeks to promote knowledge through the deliberate and intentional infliction of harms on other living things, often for the sake of studying these harms themselves.

When we try to engage in moral discussion about which pieces of research using animals should or should not be permitted, we run up against significant problems. In this article, I identify three areas where doubts are specially acute, and suggest that these can be thought of as the three Cs of animal experimentation ethics. The three Cs are not maxims, however. Instead, they indicate areas of difficulty and uncertainty that have to be negotiated before conclusions can be reached. The three Cs, I argue, should be taken together with three other dimensions of moral thinking - details, intuitions and principles. When all these dimensions are plotted, the result is a space of moral argument and perplexity. By drawing attention to some features of this space, I am able in the present article to indicate hidden weaknesses in the present systems for regulating animal research.

Reason, feeling and ethics

By intuition is meant the sense or feeling we get in a situation that things are, morally speaking, right or wrong. We often express this sense of moral rightness or wrongness even when we cannot give a very specific, reasoned account of why we have the feeling. But ethics is not just a
matter of feelings. We all recognize the existence of moral rules or principles, some of which can be rationally justified. Some of the Ten Commandments of Christianity, or the rule that we should behave towards others as we would expect them to behave towards us, are rules that many people would accept as guides for action. When we give reasons for why an action is right or wrong, we may cite one of these general guiding principles.

How are the two ingredients, reason and feeling, principles and intuitions, to be combined? One project of moral theory is to see if a set of principles can be found which gives a rational justification for our moral feelings. The general idea of this project is that it should be possible to put the two ingredients into balance with each other. If a principle (e.g. ‘Always tell the truth’) leads to behaviour that does not feel morally right, then the principle has to be modified. Conversely, if our intuitions are out of keeping with a widely-agreed principle, then we can try to educate our intuitions so they harmonize with the principle. In the jargon of theorists, this self-conscious balancing act is an attempt to find a reflective equilibrium between principles and intuitions.1

For many scientists, the introduction of feelings, or a sense of right and wrong, into discussions is uncomfortable. With the exception of some parts of psychology, feelings are not normally the object of scientific study and the ‘official’ methodology of scientific investigation leaves little - if any - room for emotions. The scientist is supposed to deal with theory and evidence in a rational, objective manner, unmoved by passions. The supposition is seldom confirmed in real life. In discussions about controversial areas of work, natural scientists become just as vehement as anyone else. But, despite this, they may at other times try to dismiss ‘emotive language’, as if matters of right and wrong, duty and integrity, are not connected with feelings in any way. Modern moral philosophy shares a part of the scientists’ attitudes here. It does not rule out the importance of feelings to morality. But it encourages rational, and impartial, reflection on how feelings can be harmonized with principles. Moral theory sometimes asks us to step aside from our passionate commitments, enthusiasms and deeply felt convictions in order to reflect
on the extent to which they can be brought into conformity with rationally-justifiable principles.

The quest for reflective equilibrium is not always successful. Even when a balance is found, this is not the end of moral debate. People who share the same intuitions and principles can still give different judgments on the same case. For example, a researcher and an anti-vivisectionist may share the same moral point of view. One of them, however, believes that the consciousness and sensation of a certain non-human species is very close to that of humans. The other does not believe this at all. Let us call this a disagreement about the details of the case. The term ‘details’ is used loosely here to cover matters of belief, opinion, probability, theory and speculation, as well as the known and agreed facts of a situation. In this sense of the term, many of the sources of argument about animal research are concerned with the details. Notice that different opinions about what the details of a case are will often result in different moral evaluations.

There are thus at least three dimensions to be explored in moral discussions: details, intuitions and principles. (Buning et al.² refer to ‘facts’ where I have talked about the ‘details’ of a case). Being aware of these can be of practical help in resolving disagreements. Often, the stumbling block is a question of fact, theory or opinion not of values or ethics. For example, I recall one occasion in which an experimentation ethics committee was uncertain about approving a project involving the study of a particular frog species found only in one habitat in Australia. As part of the research a number of the animals were to be removed from their environment for laboratory study. After some discussion, it became clear that the major issues in the minds of those with worries about the project were two: the relative abundance of the frogs, and the impact of the investigation on the rest of the habitat. Once these details had been identified, it became relatively easy to establish parameters under which the project would be able to qualify for approval.

Not all issues can be settled so smoothly. In particular, there will be opportunities for endless conflict on matters of detail which are themselves the subject of different opinions and theories - for example
the intelligence of birds, or primates, in relation to humans, or the claimed benefits of research. Principles and intuitions also collide in fascinating and complex ways. But it would be wrong to think that contest is the only problem to be encountered in discussions of ethics. There are three Cs central to ethics - contest, context and complexity. Each one of these deserves separate description.

Contest

It is apparent that ethical issues are often contested and some of the problems by which we are most puzzled have no agreed moral answer. This is obviously true of the debates about euthanasia, abortion or screening for genetic diseases. It is not just the factual or theoretical details that are disputed in these cases. Instead there is often a debate between fundamental ethical orientations or principles. In the case of research involving animals this contest is widely recognized. Nearly everyone agrees on some of the factual and theoretical details, for example, that many of the animals used by researchers have a degree of consciousness and the capacity for pain and pleasure. When Tom Regan writes that animals are subjects of a life, many laboratory scientists would agree. And when Peter Singer points to the existence of animal suffering we can all think of cases where this has happened. So, what is it that divides Regan and Singer from those who support the continued use of animals in research?

At present, the argument between supporters and opponents of animal research seems mainly centred on specific details (matters of fact and theory). Thereafter, there is a second layer of disagreement about the ethical stance that is appropriate in the light of the facts. As to details, there are observations and speculations about the degree of similarity between human and animal consciousness, sensations and lifestyles. On the ethical side, there is contest over whether, for example, it is legitimate to inflict avoidable harms on members of one species in order to secure a benefit to members of another. To disentangle the factual, intuitive and principled issues at stake is a large task and lies beyond the focus of the present article. However, what is said later about levels of concern draws attention to one of the forgotten areas in this debate.
Context

Some of the sciences, for example, chemistry and physics, aim to identify and understand fundamental mechanisms which operate in the same way in all contexts. The laws in these sciences are global - even universal (in its literal sense) - in scope. To the extent that they succeed in describing the universe, they have to be mutually consistent. By contrast, social life for human beings is not subject to universal unchanging laws. As soon as we specify a possible principle of conduct, we can think of a context where it seems not to apply or to be in conflict with some other precept. For example, suppose we accept the following maxims: first, that we should be truthful with each other; second, that we should avoid unnecessary harms to another agent. It is not hard to think of a situation where telling the truth may do more harm than staying silent. So, the two precepts come into conflict. So, should we try to live in keeping with just a single principle? This would be a bad idea for many reasons. In any case, it does not solve the present problem. Even if we limited ourselves to the principle of avoiding harm, we encounter conflicts. Consider, for example, a case where doing harm to one agent prevents a greater harm to another. It looks as if it might be impossible to live strictly in keeping with even one principle. For this reason, moral precepts are not to be regarded as strict and exceptionless. Instead, they always have to be interpreted according to the specific case we are dealing with and the context in which we find ourselves.

How does context, the second of the three Cs, affect animal research? Many laboratory procedures are more or less routine, for example those involved in antibody production, blood sampling, anaesthesia or euthanasia. However even in these cases, there are often choices about where to draw the blood from, or which adjuvant to use to stimulate the antibody response. Since any of these procedures involve a cost to the animal, it has to be asked whether there is a real need for this procedure at all in the context of the overall research program.

Contextual issues associated with these routine activities are regularly discussed in institutional ethics committees. Not all countries have such
watchdog bodies, but in Australia, for example, where an animal ethics committee system is well-established, questions about the context of procedures are standard fare in discussion of whether to approve a particular proposal. Committees consider in detail whether a given procedure, taking place in a particular project, is justified in light of the aims of the project, the potential benefits, and the skills of the researchers. These are not the only contextual issues. Others may include how often the procedure is to be used, or the maximum exposure of any given animal to a particular imposition.

It should be noticed that laying down standard operating procedures does not preclude a consideration of contextual issues. Any standard protocol for bleeding, pain relief or anaesthesia has to allow for exceptions. For example, in Australia, ether is no longer regarded as a generally appropriate anaesthetic agent for small animals. Experience has shown, however, that for some applications it remains the anaesthetic of choice provided it is used with care in a situation where appropriate precautions are taken. Decisions on when to approve the use of ether are inevitably context-dependent.

**Complexity**

The third 'C' is *complexity*. Actions and decisions are seldom simple: as the point of view from which we describe something changes we become aware of this. Lunging at someone with a dagger can at the same time be assassinating an emperor and starting a revolution. These three descriptions of essentially the same physical act draw attention to the layers of complexity inherent in it. Until we have thought about what we do from more than one standpoint, we can easily convince ourselves that our actions are simpler than they are. Consider a case where a tiny pump has to be installed under the skin of a rat. To suture the wound tightly can ensure that the pump does not become dislodged. But it can also cause extra post-operative discomfort; by focusing only on getting the sutures tight enough the researchers may overlook the other aspects of what they are doing. When they recognize that getting the sutures tight may not be getting them right then they have started to think about the other aspects
of what they are doing outside the province of science and the aims of the research they are engaged in.

Complexity refers to the capacity for a situation to be multi-layered. From one point of view, implanting the pump securely is central to getting the science done. A different layer of considerations is concerned with the welfare and comfort of the animals. Focusing on one layer to the exclusion of others is fundamental to many conflict situations. Members of ethics committee who have a background in animal care and advocacy will - from the point of view of researchers - sometimes seem to ignore the significance and excitement of the science. From an outsider’s point of view, the scientists can seem peculiarly indifferent to the pain or discomfort of their animals, since their focus is on the demands of the research and the interest of the results they are achieving. The layer on which we focus in discussing a case often reflects our own interests. To grasp the situation in its complexity will often require us to pay attention to levels and layers that have not previously come to our attention.

Problems of levels and layers are not the same as those of context. We can see this by focusing on just one context, say the housing requirements for a specific group of experimental animals. Here there will typically be different attitudes taken by investigators and animal care staff. The researchers will normally concentrate largely on the health status of the animals, ease of access, freedom from infection during any healing process that is to occur and other matters that are central to the smooth operation of their research. By contrast, care staff will often be more aware of lighting levels, environmental enrichment, the suitability of bedding materials and requirements for play and companionship. So there are at least these two layers of complexity in such a case.

The two perspectives are often complementary. Adopting both provides us with a richer understanding of the situation of the animals, care staff and investigators. Sometimes, however, the demands of one perspective will be in conflict with the demands of another. Loose bedding, for example, may be desirable for the species in question, but interfere with the results being studied. A case like this may sometimes pose a priority question: which perspective is to be given authority? In a real situation,
the complexity of the issue would not normally be exhausted by considering only two perspectives. Other layers to be remembered would include the nature of the proposed research, its position in a larger intellectual framework, the career interests of investigators and care staff, and so on. Philosophers sometimes distinguish ‘thick’ from ‘thin’ understandings of people and situations. Focusing on just one layer or one dimension of a situation gives us a thin account of it. Recognizing the existence of complexity is to recognize that any research situation is a ‘thick’ one in this sense.

The problems of ethics

Once the three Cs are recognized, it is easy to see that they will interact with details, intuitions and principles to define an area of ethical bewilderment and fascination. For example, we may encounter disagreement not only about the appropriate anaesthetic to use in a particular procedure (a contextual issue) but also about the relevance of the procedure to testing the hypothesis under consideration (which arises from thinking about another dimension of a complex situation). Likewise, two people may agree in principle that a certain procedure is ethically acceptable; they may still disagree over the issue of whether it is right to use the procedure in a teaching demonstration as well as in a piece of research. This latter, contextual disagreement will be a further difference of principle.

As already emphasized there are no exceptionless moral principles. In this way, ethics is more like toxicology than chemistry. But it lacks even the regularities found in toxicology. Moral precepts are general guides to action. But the most difficult moral problems come up either in particular situations or in specific classes of case (e.g., abortion, euthanasia, genetic screening, antibody production). As we add detail to the cases under review, we develop two things simultaneously. First, context becomes more clear, and the various dimensions of complexity in the situation start to be revealed. But, second, this often opens the way to further conflict involving facts, intuitions and principles.
Luckily, there are many situations in which the right course of action is clear, and the addition of further details makes no difference to the verdict. So there are many occasions where, for example, we recognize that it is right to do some harm to achieve some good (for example, pushing someone out of the path of a life-threatening danger). But the scientific use of animals is an excellent exemplar of how agreement on principles does not systematically translate to agreement on cases.

**Same question - different aspects**

As we uncover a situation in more detail, the scope for ethical disagreement can increase. In this section I want to draw attention to two different ways we can think about one general issue: the scale of animal-based research. In a previous paper I used existing sources in the literature together with estimates supplied by Mark Matfield and Andrew Rowan to arrive at the following estimate of scientific uses of animals:

<table>
<thead>
<tr>
<th>Country</th>
<th>Estimate ( milhões )</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>22</td>
<td>1986</td>
</tr>
<tr>
<td>European Union</td>
<td>11.8</td>
<td>1991</td>
</tr>
<tr>
<td>Canada</td>
<td>2.1</td>
<td>1993</td>
</tr>
<tr>
<td>Switzerland</td>
<td>0.86</td>
<td>1992</td>
</tr>
<tr>
<td>Australia</td>
<td>0.75</td>
<td>1989</td>
</tr>
<tr>
<td>Japan</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Rest of the world</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

This gives a total world animal use in research for the early 1990s of around 50 million - or, allowing for discrepancies and underestimates in returns, perhaps 55 to 60 million. Notice that some writers would argue that a more accurate estimate would be double this figure. If we related these numbers to populations, we find significant variations among countries. For example, in most of the industrial world, animals used in research per million population varies between an upper value of around 120,000 (the United States) and a lower value of around 14,000 (Spain). Again, within countries there are divergences in the distribution of animal use among commercial, government and university laboratories.
A noteworthy fact is that in nearly all countries for which there exists reasonable data, it appears that animal use in science has declined very significantly since 1970, when - again on conservative estimates - total world usage was probably around 110 - 120 million. Let us assume that the fewer animals used in research the better. It follows that the situation by 1990 seems to be much better than the situation in 1970. But this is only one aspect of the question we started with: the scale of animal use in science.

To see this issue from a different perspective, consider the following data drawn from Nicoll and Russell. This time, we are considering all forms of animal use in the United States:

<table>
<thead>
<tr>
<th>Numbers of Animals Used Annually in the United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of total</td>
</tr>
<tr>
<td>Food</td>
</tr>
<tr>
<td>Hunting</td>
</tr>
<tr>
<td>Killed in animal shelters</td>
</tr>
<tr>
<td>Fur industry</td>
</tr>
<tr>
<td>All teaching and research</td>
</tr>
</tbody>
</table>

The US Department of Agriculture figures show that Nicoll and Russell appear to have taken no account of animal slaughter for food apart from chickens.

The figures in other categories are no more reliable than those in the first row. The figure for teaching and research is likely an underestimate, and the deaths in shelters have been extrapolated from a very small and untypical data set and so are entirely unreliable. Despite these drawbacks, the figures can be the basis of some generalization. Extrapolation would suggest that in global terms the scientific use of animals represents no more than .25% of total animal killing by human beings. In fact, if we take into account further impacts such as fishing, land clearance and so on then .25% will grossly overestimate the contribution of teaching and research to animal suffering and death.
These new figures provide a different view on the original question: the scale of animal research. Animals used in research count for a minute fraction of human impacts on animals. Their total elimination from science would have virtually no effect at all on human-induced suffering and death in the animal world. The fact that such animal use has declined by 50% over the last twenty five years would now - for some people - hardly seem significant at all. Looking at the data from this new point of view, the same people might ask why research involving animals is so heavily-regulated and widely-debated. Others (including myself) may claim that the allocation of significant resources in this area reveals that animal use in the sciences poses ethical questions of a different sort from those posed by other impacts on animal lives. I have written on this matter in other papers, and will not follow it further here.

What I have tried to show in the present section is that considering the numbers of animals used in research is not a simple matter. Rather, there are layers of complexity associated with this question. Depending on how we locate the issue of numbers, we may be tempted to adopt different perspectives, which themselves can give rise to new questions of detail, intuition and principle. An animal protectionist may emphasise the enormous scale of a world industry dedicated to harming animals for the sake of some dubious human benefits. An animal scientist may respond by indicating how tiny the proportion of animals harmed in research is: more than 250 battery chickens are killed for every animal which dies in the cause of science. Each side has a truth of sorts on its side. But, until each takes note of the perspective of the other, their engagement with the situation remains, at best, partial.
Levels of concern

The complexity of life is such that we can often become so engrossed in thinking about only one aspect of a situation that we miss other aspects of it. There are many other ways to think about the scale of animal research apart from the two given in the previous section. And there are many different ways to think about specific pieces of research as well. In this section, I develop the idea of complexity further in order to draw attention to a hidden area in the animals debate. Once this is brought to light, it becomes obvious that present methods of regulating animal research are inadequate. It follows from what I argue that there is no place in which certain issues of fundamental importance can be debated. The only people with an influence on these matters are the animal-using scientists themselves. To a certain extent, then, scientific animal use is running free from social control and proper ethical scrutiny.

To identify the hidden area, let us put ourselves in the place of a researcher. Suppose I am committed to a worthwhile research program carried out to the highest standards. One day, I start to think about the large number of other programs which failed to get funding at the time my own one was funded. I follow this up by considering whether the proportion of the research dollar going to the sort of work I am engaged in is being well spent in comparison to how it might have been spent (say in epidemiological or public health research, or in preventive medicine programs). I have a nagging doubt that something is wrong: might it not be better if the money being spent on my research were going to some other program?

Notice where this chain of thought goes. It does not move immediately to the conclusion that there might be anything inherently wrong in what I am doing. In terms of the standards in my area, the research I undertake is of high merit, let us suppose. The ethics committee in my institution actually regards me as a model scientist, and I have pioneered some novel forms of environmental enrichment for the animals I work with. So there are no ethical problems about laboratory practice, the integrity of the research team, the standards of animal care, and so on. Notice that it was not from this point of view that my concerns arose. They involved
larger questions about how society is using its resources, and the
direction that scientific research is taking. Suddenly, I reflect that this
situation is no different from many others in which people find
themselves. For instance, a police officer who would like to see certain
drugs decriminalized may still work effectively and ethically as a
member of a drug team enforcing the very laws that she would prefer to
see changed. This looks like a similar case. The officer does everything
right, even when there is a question hanging over whether the laws the
officer is enforcing are themselves right. The very same behaviour which
is right, from one perspective, is also seen as wrong from a different one.

The thought experiment has illuminated an important possibility. It may
not be right that certain research is taking place, even when the
researcher carrying it out is doing everything right! Any air of paradox
about this evaporates once we see that actions are complex and can be
viewed from more than one perspective. The second kind of rightness is
concerned with the behaviour of the researcher, and the quality of the
research. This is the sort of rightness which is monitored and policed in
Australia by the animal ethics committees within institutions. These
committees have to include members of animal protection and advocacy
groups (as required by the national *Code of Practice*). As a consequence,
approval of research projects and housing standards is subject to
particularly tough scrutiny by people who may be in principle opposed to
all research on live animals. However, these people have no input to
deciding on the first kind of rightness. More accurately, they do not have
input to this through their membership of institutional ethics committees.

How can we start to think about the ethics of animal use away from the
institutional perspective? Any of a hundred examples would do, and I
consider, for vividness, just one. For some parts of diabetes research, a
widely-used animal model is the streptozotocin rat. Rats injected with
streptozotocin suffer damage to the pancreas which induces diabetes. At
different research centres, these damaged animals are studied for the light
they can shed on glycogen synthesis or other biochemical phenomena
which may advance the understanding and management of diabetes in
humans.
At the institutional level, ethics committees have to be aware of the special problems associated with streptozotocin (it is an unstable and dangerous substance), the special care needs of the affected animals and the need for research involving such high impositions on the animals to be of the best quality as judged by international standards. It is at this level of concern that the input from animal advocacy groups is mandated in Australia and some other countries. Where there is doubt about a specific research proposal, committees may rely on external referees to assure them of the competence of the investigator and the significance of the work. What is important to recognize, however, is that these institutional-level concerns do not give a complete answer to the question: ‘Is it right to undertake this piece of research?’

Here are some questions which cannot be adequately addressed as long as the focus is on the institutional setting:

1. **How successful has this general line of research been in illuminating mechanisms, or stimulating new approaches to treatment and management of human diabetes?**
   
   This question is, at best, only partially addressed at institutional level, and has by and large to be left to the judgment of the scientific community and funding bodies. The peer-review mechanism of national grant-awarding bodies does not normally provide for lay input or for any form of independent ethical scrutiny.

2. **To what extent are animal-based studies proving currently productive for the general understanding of the relevant human biochemistry?**

   This can be answered, if at all, only by considering the field of biochemistry as a whole at a given time. National strategy committees, or review sessions at international conferences, would be appropriate places for an explicit discussion of this topic. These normally have no animal protectionist input, or independent ethical scrutiny. If national or international review impinges on discussion at institutional level it will only be via the expert judgment of researchers and referees. At institutional levels, it has to be taken on trust that programs which qualify for competitive funding will be productive given the current directions in biochemical research. In summary, it seems that only
scientists themselves will ever give consideration to, and attempt answers for, this question.

(3) What is the appropriate weight to be given to research on diabetes (including the rat model) compared with research on other human health problems?

This third query is of the same kind that was put by the investigator in our thought experiment given above. It is only one of indefinitely many comparative questions which raise matters that can only be understood in relation to national and international trends, funding practices, and social analysis. Unlike the second question, this one cannot easily be fitted in to discussion at specialist scientific conferences. Like the second one, if addressed at all, it is likely to be considered by expert groups without the input of lay persons and animal protection advocates.

Conclusion: Arenas of conflict

The previous section raises questions of context and complexity that are seldom addressed explicitly in the literature on animal research. Philosophers, obsessed with principles and ethical theories, often gloss over the details of how moral decisions are reached. It is much easier to say that a practice is wrong than to suggest ways in which it can be made better. At the most general theoretical levels, there is a tendency to think in terms of exclusive positions: complete abolitionism at one side, and freedom for science on the other. Debates between such extremes are generally sterile, however inspirational their ideals. Institutions, caught in the middle, have set up committees and adopted national standards in an attempt to find a way forward that respects some of the demands of science on the one hand and the case for animals on the other. What I have argued above is that this is not enough. The ethical scrutiny of scientific animal use inevitably raises questions that cannot be settled within the institutional context.

In his address to the 10th annual Summit for the Animals on April 7, 1995, in St. Louis, United States, Merritt Clifton (editor of Animal People) urged the animal protection groups to become a ‘loyal opposition’ to science. In a parliamentary democracy the loyal opposition strenuously opposes the government of the day while sharing with it
respect for national laws, principles of democracy and due process. Australia is fortunate that it already has a loyal opposition, many of whose members sit on animal ethics committees. For them, however, the experience can be frustrating. Several of the high-level considerations that may have informed their resistance to animal research can find no expression at the institutional committee. When a proposal for research into a disease which affects only a small proportion of the population is put forward, there is no space for saying that the money would be better spent on tackling the health problems of Aboriginal communities. This is not an issue for a scientific establishment, like a university, to decide. Indeed, the funds for which the researcher is applying may well not be available for any other purpose. It follows that only some of the rights and wrongs of various pieces of research can be debated at the institutional level.

The establishment of animal ethics committees may give the misleading impression that the only arena of conflict over animals in research is the institutional one. It is not, and there is no reason for excluding the loyal opposition, and the rest of society, from playing its part in the ethical evaluation of science at levels beyond the university and the research laboratory. Most scientists recognize that science is not something above the law, and that they have no special authority when it comes to assessing the ethical implications of their work. It is surprising, then, that so little attention has been given to establishing national committees of ethical review, with a broad mandate and a wide membership. Such committees would become part of larger structures of scrutiny which would provide some assurance that science and technology is not running out of control.

For the purposes of this brief article, I have ignored the standard political processes in which animal protection organisations, the media and scientific pressure groups already play a part in dealing with contested issues. The possibilities for political activity, however, are not limited to elections, demonstrations, journalism and lobbying. Given that controversy can arise at many levels, the decision to include members of the ‘loyal opposition’ in decision-taking at institutional level in no way precludes them from having an important role to play at other levels.
Being aware that such levels of concern exist is also an incentive for establishing structures which can permit societies to explore more of the complexity of the problems which worry us.

Notes

7. While checking Nicoll and Russell's figures, I found that the USDA maintains an internet information service which includes up to date figures on all categories of animal slaughter. The URL for this service is http://www.usda.gov/nass/.

Biography

Andrew Brennan moved to the Chair in Philosophy at the University of Western Australia in 1992, having previously been Reader in Philosophy at the University of Stirling, Scotland. He works mainly on philosophy of mind, philosophy of education and environmental ethics. His collection, *The Ethics of the Environment*, was published in 1995 by Dartmouth Books. Since 1993 he has chaired the Animal Experimentation Ethics Committee at the University of Western Australia. In the last few years, he has published several articles on ethical and policy issues associated with the role of animals in scientific research.