News

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Mapping the moral landscape — bioethics, biotechnology, and science

The Context

Introduction

There is a great need for us all to reflect upon the social and ethical aspects of science, technology, agriculture and the knowledge economy with which these things are now associated. Health has had a focus on these things for some time, and this focus is now being strengthened in other sectors as well.

I wish to discuss some of the ethical questions and challenges that are being raised in agriculture, horticulture and health by developments in biotechnology. But I want to start by looking at some maps. I love maps, find it impossible to go to a new place without seeking out that magic piece of paper that will give me some indications of what I might find, how I could get there, and more importantly, how I could get back again! I am even tempted on occasion to immerse myself in the map, and forget that the point of the map is so I can get out there and better experience the world it describes!

But maps are not the world. They are only descriptions of the world — they conceptualise it, organise it, ignore some things and highlight others, point out the relationship of one thing to another. How we orientate the map makes a difference to how we see things, whether it be the map that places the Antarctic at the top, or the maps in the New Zealand Historical Atlas, that view the country from different perspectives and hence make the country quite a different place.

Maps help us to make sense of the world that we know, to organise it, and to predict, from the maps that others have made before us, where we might be or where we are going. The maps can be on paper, in our heads, or captured in songs as done by the Australian aboriginals.

Sometimes, we know the landscape so well we are not even aware of the need for a map anymore, and sometimes we venture into places where we have left the map at home, or where no map has been drawn - and then we need to make our own — if only so we can find our way home again.

Maps of the moral world

Just as maps can help us find our way around the physical world, or help us conceptualise how things have changed over time, so mental maps can be useful in thinking about and acting in the moral, social and ethical world. Mental maps can help us make sense of the moral or ethical landscape we inhabit, or are planning to venture into. Mental maps can help us to orientate ourselves, to choose one path rather than another, to understand how one choice might relate to the next.

We have a number of mental maps of the moral landscape. Some are very formal products of the intellectual life and are well articulated and extensively analysed. In western culture, the disciplines of philosophy and theology have produced many such maps, which describe the moral world in a number of different ways, in terms of deontology, consequentialism, various theories of justice, rights and responsibilities, natural law, and casuistry. All these approaches, and more besides, have been important ways of describing and making sense of the ways that we go about making decisions about things and choices of value.

Like any map, no one map is complete. No one map says it all. Every map also says something about the person or people who make it, reflects their view on the world, captures only what they are able to see.

And some of our maps are very informal - mental maps that are so well known, so internalised that they do not need to be analysed, or articulated. I think here of many of our cultural maps — how we should treat children, the ways we care for visitors, the norms of relationships, the behaviours we welcome or discourage. It is only when we meet people who do not share the same cultural map that we discover the need to explain, to lay things out.

The challenge - part one

We live in a time when many of the formal and informal

Contents ...

This issue contains the facts sheet on
Doing better animal experiments, together with notes on genetic nomenclature of laboratory animals.
The facts sheet is also available as an offprint.

maps of our social, cultural and ethical lives are being questioned in profound ways. It is not just that the maps are incomplete — that is easy to acknowledge. It is that, at times, the maps no longer even seem to speak of the territory in which we find ourselves. Then we can feel disorientated, and long for familiar surroundings where all is known.

There are a number of issues currently challenging our moral maps.

Uses of biotechnology

- genetically manipulated food;
- transgenics — moving genes across species;
- xenotranplantation - moving organs across species;
- germ line gene therapy — changing genes in a human in a way that will change the genes passed on to the next generation;
- the particular social uses of technology, such as reproductive technology which is changing understandings of what it means to be a parent and who is a parent (the social, genetic or gestational mother? The genetic or social father?)
- genetic testing — prenatal, for risk of late on-set conditions.

Changing meaning of cultural concepts.

Behind the high-profile issues of biotechnology itself we have some wider challenges. The social, historical and cultural context is intensifying the difficulties that biotechnology presents. There are difficulties with concepts that have always been assumed, e.g., what is natural, or what moral standing should animals have? They have usually been seen as self-evidently other, in a different moral category than humans. We have philosophers seriously arguing that such a position is not tenable, that some animals should have the same rights as some humans. The moral map that described the significance of certain categories is being questioned and redrawn.

Limits of human knowledge

And then there is the question of the limits of human knowledge — when we are playing god and are there times when we should not do it? And if there are no limits on where we should take knowledge, are we then controlled by the technology and no longer able to shape it to the needs of the human community?

Science as a social practice and world view is based on the assumption that more knowledge is a good thing. That is an approach to life that has been very productive and contributed to many advances that most of us would not be without. But I think there is also an awareness that more knowledge of the scientific kind may not always be what is needed, and may at times be a major problem. Given the sort of creatures that humans are, some knowledge may not be a good thing, and may come with too many risks attached, given that we are social and political animals, and given that often it is wisdom that is required, not know-how. Many aspects of life are usually seen as private choices, e.g., choices about when to have children and with whom; or what tests to agree to with the doctor; or what plants to grow on one's farm, or what methods of animal care to use.

But technology, and changing social norms, often make it difficult to sustain the distinction between public and private. If I am a farmer, and choose to breed the cows by cloning, is that anyone else's business? Can people demand that I let them know that because they think such an approach to reproduction of animals is wrong, or want to choose not to support farmers who use such practices? Or, more topically, if it is unacceptable to one cultural group to put human genes in a cow, is it acceptable to do so? If those carrying out the research are comfortable with what they are doing, and there are no unacceptable risks as defined by the world view in which they are working, is that sufficient for them to be able to continue? Have we privatised culture to the point where it can no longer have an impact on scientific practice— which we seem to be defining in public policy as culture - free (rather than as an expression of one culture)?

Many of the ethical arguments that are being voiced are about protecting choice and privacy. But some of the choices we make have consequences for others, or are significant to others, or change the long settled social assumptions or internalised ethical maps of our cultures. We now must find ways to talk about these things, and to decide what new choices are acceptable, and why.

Multiculturalism and post - modernism

This raises another issue. We make these choices in a context where no one tradition has authority. In New Zealand we now recognise that the Treaty of Waitangi is an important agreement that needs to be reflected in the ways we organise our social and institutional lives. We can no longer assume the dominance of one tradition simply because it has had power for so long.

But in addition to the particulars of the New Zealand context, we live in a world where the dominance of one cluster of traditions, those of western culture, is being both recognised and resisted. The working assumption that western culture and all that goes with it is necessarily good, is widely questioned, and other cultures and traditions are asserting their positions and demanding to be recognised.

This is all part of the so-called "post-modern" world, a world constructed from many traditions, but with no ultimate authority to which we can appeal to resolve conflict or differences of opinion. We now need to negotiate, not only the resolution, but also the means or the process by which we will negotiate the resolution.

Science and ethics

It is in such a context that science and biotechnology are now being examined and questioned, and in which we are struggling with the ethical issues. The moral maps are being questioned and redrawn. We are drawing maps of new territory where we have not gone before, and our interpretations of the landscape are being contested.

Understandably, there is a hope that we will find our way through the terrain, that someone or something will sort out the mess. There is a tendency in some circles to expect or to ask science to do this. This expectation takes two forms.

If we do more or better science, then the problems will resolve themselves.

Many of the defenders of genetically modified food take this approach. The implication is that if we do more research we will resolve the difficulties, establish the safety of genetically modified food, and hence resolve the disagreements.

While more science will frequently help, information in itself will not resolve all the ethical questions. Even if we can be confident about the level of safety of xenotransplantation (if we can be totally confident of the level of risk of some virus jumping the species barrier, and if we can be sure that the recipient will not reject the transplant) that still leaves us with a judgement about how to respond to the level of risk that still remains — a subjective and value-laden judgement — and a cultural choice about whether or not it is acceptable to have animal organs in humans. We may ultimately decide it is acceptable, but that will be a cultural not a scientific decision.

Science itself can replace previous traditions that provide us with meaning, that gave us a world view through which we interpreted the significance of new discoveries or choices.

In previous generations, we made meaning within traditions that had been passed down the generations, frequently religious traditions. Science can only take over that role if we are prepared to give it a similar role and status to that given to those traditions.

There are some who argue that science is indeed trying to do this, that our developing understanding of evolutionary theory and of genetics provides us with a biological explanation for why we think and act the way we do, of why we have evolved into the sorts of creatures that make certain choices about how we arrange our social lives in communities.

Others may not take such an extreme position, but nevertheless expect science to provide us with the map that will guide our choices about what sort of future we will create for ourselves. At its most crass it is simply the position that argues that science "knows" what is safe, good and will make the future a better place, and dismisses as ignorant, "out of touch" or luddites all those who would retain some scepticism about the adequacy of current scientific understandings, or who remember that previous promises of science did not always deliver the consequences that were promised. But, whichever form this reliance on science takes, there are problems with it.

First, it is a new form of fundamentalism, and hence open to all the familiar critiques relating to exclusion of diversity and inability to incorporate new understandings. Second, it assumes that science is capable to giving us meaning, or explaining what it is to be human, of describing value. And it seems to me that this is well outside the possibilities of what the scientific method can deliver. Science is essentially about questioning, about putting up theories to explain how things work — and then trying to knock them down, to disprove them. Science is essentially sceptical about any explanation of the world. But meaning or value comes from quite a different sort of knowledge.

The challenge — part two

If we live in a world of biotechnology, social and cultural diversity and shifting understandings of critical concepts through which we have made sense of our world, how do we move forward, how do we deal with the ethical issues of our time? What is the moral map with which we can work? I wish I knew!

I think we are like people who have entered some new territory, have some expectations of what they are going to find (based on stories that other explorers have brought home) but who now must improve on those maps, and continue to explore. We are mapping new territory, and it is not unreasonable to take time to do it well. I think it requires three key things.

- The ability to sustain difficult conversations, across disciplines, and mindful of the networks of power that would want to steer us towards a particular understanding that would sanction the continuance of certain forms of relationship.

- Time. We are talking here about huge cultural changes. We cannot expect a culture to come to terms with the knowledge of biotechnology overnight. Biotechnology is big and complex and profoundly challenging. It will take time to even begin to sort this one out and I think we should take what time we can.

- Social institutions that do not run from difficult conversations, nor take refuge in the assumption that the scientific world view has authority in the public sphere, and that all cultural and ethical arguments are for private consumption only.

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Editor's note

This is an edited version of an address given by Dr Nicholas on 9 August 2000 at the opening of the Animal Welfare Science and Bioethics Centre at Massey University, Palmerston North, New Zealand (see below).

Opening of Animal Welfare Science and Bioethics Centre at Massey University

This new Centre was officially opened on 9 August 2000 by the Hon. Pete Hodgson, MP, the New Zealand Minister for Research, Science and Technology.

The Centre was formed last year at Massey University to profile the breadth and depth of expertise at Massey University in animal welfare science and bioethics and to provide a vehicle for putting together multi-disciplinary teams to deal with specific issues as they arise, as well as promoting thinking at the science-ethics interface.

The Centre's mission is:

- to promote, via scientific research, education and advice, the humane and responsible care of animals; and

- to develop and apply ethical principles to guide human-animal interactions and the use of biotechnology.

The Opening also included addresses from its Director, Professor David Mellor, Dr Judy MacArthur Clark, Chairperson of the UK Farm Animal Welfare Council and Dr Barbara Nicholas, a bioethicist from Christchurch.

Professor Mellor recently retired from the Board of ANZCCART after seven years' service and continues to be a very strong and active supporter of ANZCCART. In his speech he explained the development of the Centre and the long history of Massey University and its predecessor in research to improve farm animal welfare. The new Centre has strong support from the Heads of the Institute of Food, Nutrition and Human Health, the Institute of Veterinary, Animal and Biomedical Sciences and the School of History, Philosophy and Politics. Centre members also come from the Institute of Molecular Biosciences and the Schools of Psychology and of Maori Studies at Massey University.

ANZCCART's 2000 conference

University of Adelaide

30 November — 1 December

Farm animals in research — can we meet the demands of ethics, welfare, science and industry?

An interesting and stimulating program awaits you at this very topical conference.

A program and registration form is inserted in this issue.

To change or not to change? A question for humane education

Concern over the growing desensitisation of young people to the increase in violence and various forms of exploitation in modern society has prompted Animals Australia to institute a national drive to encourage education authorities to introduce formalised humane education programs into all levels of education.

Animals Australia aims to promote educational programs which actively recognise and incorporate the principle of humane relationships between human and other sentient beings in order to realise a violence free society. In doing so, tangible and effective support is being offered to interested teachers anywhere in Australia in the form of immediately useable curriculum resources and advice on how to access other relevant information and resources. Especially highlighted by this support program is how to access alternatives to the many traditional harmful uses of animals in life science courses so that teachers may more effectively uphold the Three Rs of the *Australian Code of Practice for the Care and Use of Animals for Scientific Purposes* (NHMRC, 1997). Accessing and utilising alternatives has proven one of the most difficult aspects of implementing the Code for educators (Langley *et al.*, 1999).

Formalised humane education programs are now mandatory in eighteen of the States of America and the number of States moving to introduce such programs is growing (Schwartz, 2000). However, this is an issue that, to date, has gone largely unaddressed by education authorities in Australia, despite the fact that many individual educators engage their students in critical thinking and problem-solving learning experiences that emphasise the principles of humane education. It is time, however, that such informal work becomes more formalised and is introduced into secondary school subject syllabus documents and tertiary study program documents.

Violence and conscientious objection

There are two significant yet dichotomous phenomena that are clearly emerging amongst youth culture today. First, almost all young perpetrators of violent acts against fellow human beings have an established history as animal abusers and / or killers. Recent research shows quite clearly the strong and undeniable link between animal abuse and many forms of child abuse, domestic violence and serial killing (Ascione and Arkow, 1999). The link between animal cruelty and criminal behaviour is currently drawing increased attention to the humane education movement.

Second, a growing number of students in life science courses at secondary and tertiary levels are conscientiously objecting to many traditional, harmful uses of animals in those programs and are requiring that the system provides them with viable alternative learning experiences (Knight, 1999a). In Australia, veterinary science students at Murdoch University (Knight, 1999b) and Sydney University (Newby, 2000), have demonstrated that alternative learning pathways are not only available and useable but also that Australian universities are forward thinking and proactive enough to consider introducing far-reaching curriculum changes as a result of these students' concerns.

The existence of the Code of Practice has contributed greatly to the growth of conscientious objection amongst tertiary students in particular. Students who have concerns about invasive methods of learning subjects such as physiology and anatomy now have legislation to which they can appeal in their arguments for a more humane approach.

Humane education as purposeful change

Today's educators and educational curricula at all levels continue to be overwhelmed by demands for change. The kind of change envisaged is innovative change, change for the better, change that may enable educational institutions to lead society instead of following societal change brought about by external pressures that are often seen as beyond the control of educational authorities or individual educators.

This is a huge responsibility and one that continues to exasperate even the most dedicated of teachers. How to fit more in to an already crowded curriculum? More importantly, what to add to students' learning experiences? Any future changes must take cognisance of valid reasons for change. Any initiative that strives to offer a cost-effective, long-term solution to decreasing the level of violence and rampant exploitation (of people, of animals, of the environment) must be seen as a worthwhile educational objective. Any initiative should also highlight that some traditional ways of teaching and learning actually belong in that same paradigm and it is time to move forward without compromising academic integrity or success.

Definitions

Humane education may be described and defined in many ways. Essentially, it is a process that highlights the need for compassion and respect for all life and all ecosystems by recognising the inter-dependence of all living things. From the animal protection perspective, humane education has the potential to serve as a long-term, cost-effective strategy that could produce a lasting and large-scale improvement in the quality of animals' lives and thereby human lives. It is a process that strives to create and nurture a culture of empathy and caring by stimulating the moral development of individuals to enable them to become compassionate, responsible and just citizens. It is a process that relies on introducing students to facts and realities as well as to feelings, thoughts and emotions. Students' cognitive, affective and behavioural patterns are actively engaged in the process.

Implementing the process

Humane education initiatives may be delivered in two main ways: informal and formal.

Informal methods include public education and political lobbying campaigns run by animal and environmental advocacy groups. Changes in attitudes and behaviour have often been successfully achieved as a result of well-run campaigns on specific issues. Also included in this category are the efforts of concerned individual educators to raise students' awareness of these issues within existing school subjects. Books, magazines and television programs are also valuable tools, but these may reach fewer individuals than can more formalised approaches.

Formal humane education programs in schools and tertiary courses are especially important, since these represent the main vehicle for reaching the greatest numbers of individuals and for influencing attitudes and behaviours of the next generation of citizens.

Anticipated outcomes

The humane education process introduces students to an understanding of their own needs, feelings and reactions as well as to those of others. It encourages students to think critically about the consequences of their actions in a wide range of environments by linking their learning to an understanding of human and animal welfare and environmental issues.

Furthermore, well designed programs sensitise both students and educators to various social philosophies and life styles as well as to the

many attitudes and behaviours that human beings exhibit towards the rest of the natural world. Students come to understand the ethical dilemmas generated by these different philosophies and life styles and they are better able to make informed judgments and take compassionate action. Humane education programs also promote critical thinking and problem-solving as essential tools for dealing effectively with the issues raised.

Humane education materials

Although science, or more particularly biology, is often thought of first as the subject most likely to be able to incorporate a humane education emphasis, it is important to note that every single curriculum subject is capable of reflecting a humane ethic.

Animals Australia can assist teachers and students by supplying a range of services including:

- an annotated list of humane education web sites;
- an annotated list of animal welfare web sites that include a humane education component;
- information on the latest alternatives to harmful animal use in school and tertiary programs, including computer programs, virtual reality and other web sites, reference books, CDRoms, electronic databases, videos and print material;
- brochures and fliers that promote the humane ethic;
- information on how to conscientiously object through appropriate channels;
- access to ready-made humane education materials in the form of classroom activities, whole units on particular topics, books and other print material all of which may need little or no modification to be immediately useable;
- access to a network of interested educators who implement the humane ethic in their programs; and
- guest speakers.

Conclusion

The Humane Education Division of Animals Australia aims to promote awareness of the need for Australian education to actively incorporate a humane ethic, to develop and promote appropriate educational materials of immediate interest and use to educators and to promote and uphold the principles of the Code of Practice (especially the use of alternatives). Interested educators are invited to contact the Division for further information.

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References

Ascione, F. R. and Arkow, P. Eds. (1999) *Child Abuse, Domestic Violence and Animal Abuse: Linking the Circles of Compassion for Prevention and Intervention*. Purdue University Press, Indiana.

Knight, A. (1999a) Alternatives to harmful animal use in tertiary education. *ATLA*, **27:** 967-974.

Knight, A. (1999b) Refusing to quit: How we won the right to conscientiously object at Murdoch University. *Animals Today*, **6:** 4.

Langley, G. *et al.*, (1999) Accessing Information on the Reduction, Refinement and Replacement of Animal Experiments: Report and Recommendations of a Focus on Alternatives Workshop. *ATLA*, **27:** 239-245.

Newby, J. (2000) *The Veterinarian.* March 2000.

National Health and Medical Research Council, (1997) *The Australian Code of Practice for the Care and Use of Animals for Scientific Purposes.*AGPS, Canberra.

Schwartz, S. Humane Education Committee, PO Box 445, Gracie Station, New York 10028. (personal email communication, July, 2000).

Editor's note

Readers are referred to the following conference proceedings or articles relating to this subject which have been published by ANZCCART.

Anon (1999) The University of Adelaide's policy on the use of animals for undergraduate teaching. *ANZCCART News* **12(1)**:11.

Brennan, A. and Einstein, R. (eds.) (1997) *Animals in education: value, responsibilities and questions*. ANZCCART, Adelaide.

Einstein, R. (1994) Can I teach biology without using animals? In: *Animals and science in the twenty-first century: new technologies and challenges.* (eds. Baker, R.M., Einstein, R., Mellor, D.J. and Rose, M.A.) ANZCCART, Adelaide.

Lluka, L. and Oelrichs, B. (1999) Replacement and reduction of animal usage in teaching physiology and pharmacology at the University of Queensland. *ANZCCART News* **12(2):** 4-7.

Loiacono, R. (1998) Animal replacement and reduction: multimedia teaching aids in behavioural pharmacology. *ANZCCART News* **11(2):** 4-5.

ANZCCART Animal Welfare Officers' Workshop

Adelaide

29 November, 2000

A one day workshop will be held in the Hawker Centre, Waite Campus, University of Adelaide at 10 am on Wednesday, 29 November, 2000, the day preceding ANZCCART's 2000 Conference.

The workshop will address issues relating to the use of farm animals in research and teaching, including cloning. It is intended principally for animal welfare officers in universities, scientific institutions and government, although other interested persons are welcome to attend.

Discussion will also cover the role of animal welfare officers within institutions and how best to coordinate communication between them.

Registration is $50, which includes morning and afternoon tea and lunch.

Please let ANZCCART's Adelaide office know by 15 November if you will be attending.

Book review

Livestock, ethics and quality of life

edited by
John Hodges and
I. K. Han
CABI Publishing, 2000
Wallingford, OX10 8DE, UK
email:orders@cabi.org
269 Pages
Price: £49.95
ISBN O 85199 362 1

This is a stimulating and thought provoking book essentially designed to bring together a consideration of animal science, particularly the components of livestock production and biotechnology, ethics and quality of life issues in both developed and developing economies in the world.

The 13 chapters in the book are written by some 18 authors who represent a broad spectrum of backgrounds including biology, agriculture, ethics, philosophy and religious studies. Most of the authors bring international experience and background to their contributions.

The book had its origin in a special symposium at the VIII World Congress on Animal Production held in Korea in 1998.

The book is based on a premise that change is now occurring so rapidly in animal science, that livestock production and international commerce link livestock, ethics and quality of life together in a completely new and challenging way. The authors generally recognise that the benefits of increased food production resulting from recent advances in biotechnology and world trade should not be disparaged or rejected. They are also conscious of the need to examine the other side of the coin in terms of animal welfare, sustainability, quality of rural life and protection of the environment.

The authors also emphasise the need for an awareness that in times of social, economic and lifestyle changes new issues arise which are often not apparent when our world view is confined to one professional discipline.

Australian and New Zealand readers of the book may reflect that the multidisciplinary approach supported by the authors mirrors the integration of science, ethics and community input, which is an essential component of the animal ethics committee system in place in those countries which have advanced the management of welfare of animals used in science so successfully.

The book comprehensively explores an ethical dilemma raised by an author in highlighting animal welfare concerns. The dilemma involves the welfare of animals maintained in increasingly intensified management systems, resulting in the availability of animal products at lower costs in the western world balanced by the prospect which these systems offer to the billions of people in the developing world to increase their intake of animal protein and thus experience a higher quality of life.

The chapter in the book entitled *Animal welfare and use* provides a number of models detailing the relationship between humans and animals in society. These models range from ownership (i.e., animals are present purely for human use and exploitation), to the opposite extreme, the worship of animals. The chapter then considers a variety of applications of biotechnology to farm animal use and production against this spectrum of models of fundamental human attitudes and relationship to nature. The result is a useful method for understanding some of the different views which surface in community debate on animal welfare and biotechnology issues.

The positives and negatives of developments in science and technology occupy much of the deliberations in the book. Respective authors move from one of two isolated positions, *Just because we are able to do something technically does not imply that we must do it*, versus *just because we have not done something previously does not imply that we must not ever do it*. The balance of the arguments assist the recognition of an ethical framework or mechanism by which decisions can be made on whether, or how far, we should use or limit the use of technology or biotechnology.

As an example of this process there is focus and debate on the use of organs from animals (xenotransplantation) with animal rights, animal welfare, human safety and the balance of limiting harm and doing good discussed as components of the debate. Again the book provides a practical and useful mechanism for understanding the diverse opinions which surface in debates on these issues.

The impacts of the intensification of agriculture and free trade on the economies, quality of life and development specifically in Asia, Latin America and African countries are comprehensively and clearly outlined.

Seeded throughout several authors' contributions to the book are bold statements which may jar a reader of utilitarian background. These statements relate to a view that scientist and businesses are intrinsically self-centred and lack ethics. The book also details inaccurately examples of cruelty to animals including a description of a luridly "cruel" practice involving the processing of a beef carcase in a abattoir following a rapid and clearly effective stunning of the animal concerned.

The book is a welcome addition to the available literature concerning animal production, animal welfare and ethical considerations. The concepts and ideas are outlined in a concentrated fashion but the result provides a rewarding outline of the issues. The comprehensive, relevant and detailed reference lists at the conclusion of each chapter are excellent and will provide additional material to readers wishing to further pursue issues.

The book should be read by all persons who wish to participate in and understand the continuing debate involving biotechnology, animal production and welfare. The book directs our attention well to key questions about who "owns" science, who formulates its ethical framework and how the common good is best served in respect to the environment, animal welfare and food safety.

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Letters

A new adjuvant

CSIRO Animal Health scientists have developed an adjuvant using a mixture of compounds with known adjuvant activity which performs as well as Freund's adjuvant, but which does not cause the lesions that are often associated with Freund's adjuvant.

Immunological adjuvants are substances that enhance the immune response to an antigen or a group of antigens. They are almost essential to obtain good immune responses. Adjuvants act in several ways including immunomodulation, antigen presentation, targeting and ensuring antigen persistence. One of the consequences of the administration of adjuvants is an inflammatory response at the site of injection. The nature of adjuvants and their mode of action was the topic of a monograph produced by ANZCCART (1998) and has been an issue of concern for some time.

Many hundreds of compounds have been tested for adjuvant activity with varying results. Some of these not only enhanced the immune response but also caused significant and unacceptable lesions at the injection site. Fifty years ago a very potent adjuvant was described and it remains the adjuvant of first choice for experimental vaccinations. This is known as Freund's complete adjuvant (FCA). Unfortunately, when used inappropriately and in some animals, FCA causes adverse and unacceptable side-effects.

During the course of vaccine development at CSIRO Animal Health there was a need to develop an adjuvant suitable for use in sheep with a conjugated protein vaccine. Dr Khin Than and her colleagues tested a number of combinations of compounds with known adjuvant activity. The outcome of this testing was the identification of a mixture of three compounds, which when mixed together resulted in outstanding adjuvant activity in sheep. This formulation of Quil A, DEAE dextran and montanide 888 had not previously been used.

A series of experiments was undertaken in which this new combination was directly compared with the adjuvant activity of FCA in sheep, cattle, rats, rabbits and poultry and with a number of different antigens. The injection site reactions were also compared.

The results show that the adjuvant was able to induce antibody responses that were equivalent to those induced by FCA but with considerably less inflammation at the site of injection. This adjuvant has application in research as well as in production livestock.

The procedure for preparing triple adjuvant is outlined below.

For approximately 20 x 1 ml doses

1. Dissolve 15 mg of Quil A and 150 mg of DEAE-Dextran in 5 ml of water or PBS.

2. Filter through a 0.22 micron filter.

3. Mix 4 ml of the Quil A / DEAE-Dextran solution with 6 ml of immunogen in water or PBS. The concentration of immunogen will depend on the source of immunogen and species to be vaccinated.

4. Add the aqueous material to 15 ml of Montanide ISA 888 50V in 1 - 1.5 ml aliquots, mixing for 30secs at each aliquot addition in a homogeniser at approximately 15,000 rpm. Ensure that there is no overheating.

5. A critical factor is the ratio of aqueous material to oil of 2:3

Recommended doses for different species:

Sheep	1 ml
Cattle	2 ml
Rabbit	1 ml
Rat	0.3 ml
Mouse	0.2 ml
Chicken	0.5 ml

Reagents:
Quil A
Superfos Biosector a / s
Frydenlundsvej 30,
DK-Vedback,
Denmark

Supplier: Asia Pacific
Specialties Chemicals Limited
(APS Specialities)
7, Business Park Drive,
Notting Hill, Vic 3168
Phone: (03) 9 558 8800

DEAE-dextran
Made from dextran with
MW~500 000
Pharmacia LKB
Code No 17-0350-01
Uppsala, Sweden

Montanide ISA 50V (Seppic)
Montanide 888 / Marcol 52
W / W 1 / 7.7
V / V 1 / 9

Supplier: Tall-Bennett Group
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Reference

ANZCCART (1998). *The use of immuno-adjuvants in animals in Australia and New Zealand.* ANZCCART, Adelaide.

The role of animal testing in the development of new anticancer drugs

Cancer is not only one of the common causes of death in New Zealand but also one of the most personal, affecting families as well as individuals. Surgery and radiotherapy continue to be the most widely used forms of cancer treatment, but the propensity of tumours to migrate and grow at multiple sites in the body (metastasis) means that advanced cancer has to be treated as a disease of the whole body. Over the last 55 years the science of cancer chemotherapy has emerged, and a range of anticancer drugs is now available to combat this disease.

It is interesting to reflect on how these drugs were developed, and how better anticancer drugs might be discovered in the future. This is of particular relevance to our Centre at the University of Auckland, where the development of better cancer treatments is a major goal of research.

The earliest forms of cancer chemotherapy were discovered by accident. The drug nitrogen mustard was developed as a result of an accident with mustard gas canisters during the Second World War. The drug methotrexate, an antagonist of the action of vitamin B6, was developed as a consequence of the finding that the administration of vitamin B6 to leukaemia patients accelerated their disease. While these two drugs made major early contributions to cancer treatment, some other drugs owe their origin to experimental tumours growing in mice. Strains of inbred mice have been developed from the beginning of the 20th - century, and spontaneous

and carcinogen-induced tumours originating in these strains were transplanted and used for testing of new anticancer drugs.

In the 1980s, several groups began to question whether large-scale testing for new anticancer drugs in mice was the best approach for new drug discovery. First, there was increasing concern as to whether the use of very large numbers of mice by pharmaceutical companies and other drug development groups could be justified ethically. Second, there was a possibility that drugs of potential importance to humans might be missed by studies in animals. Third, animal experiments were very expensive.

In our Centre, we succeeded in growing mouse leukaemia cells in culture and first explored whether cultures gave results similar to those already obtained for the same cells growing in mice. Encouraged by the predictive ability of the culture experiments, we took advantage of new culture technology that had become available for immunological experiments and applied them to the growth of human cancer cells. In 1984 we published a method of growing human cells in 96-well culture plates that would potentially allow large-scale testing of new anticancer drugs (Finlay *et al.*, 1984). Two years later the US National Cancer Institute instituted a series of workshops, to which I was invited, to explore the use of cultured human cancer cells in drug development. The resulting panel of 60 human cell lines (Alley *et al.*, 1988), representing major classes such as lung cancer, ovarian cancer, brain cancer, renal cancer and melanoma, has now been used for screening of over 60,000 new potential anticancer drugs.

In the 1980s further technologies were developed as alternatives to animal testing. Genetic engineering allowed selected protein targets for anticancer therapy to be grown in bacteria and isolated for use in cell-free assays. Here, the effect of new drugs on specified targets could be testing directly. Robotic techniques allowed processing of new drugs on an unprecedented scale. As a result of these new technologies, new classes of drugs are currently being advanced for clinical trial in cancer patients. They include the drug KI-1033, developed in our Centre in collaboration with the pharmaceutical company Pfizer Global Research.

Do these new advances make drug testing in mice redundant? Actually, they highlight our ignorance of the many aspects by which anticancer drugs work. Unfortunately, cell-free systems and cancer cell lines do not reflect all the properties of real cancer. Much more work is required, and studies in our Centre are currently aimed at using cancer cells cultured from tumour material taken from patients at surgery, in order to gain more information on the link between drug action and tumour regression (Baguley *et al.*, 1999). Theoretical studies are able to predict to some extent the distribution and metabolism of new anticancer drugs, but they cannot reliably predict the occurrence of toxic side effects. Animal studies still form an essential link between drug discovery and clinical trial, and examination for toxicity is in fact legally required. In the United States, testing is required in one non-rodent species before a new anticancer drug can be used in cancer patients but in the United Kingdom (and New Zealand), testing in rodents alone is now accepted (Newell *et al.*, 1999).

References

Alley, M.C., Scudiero, D.A., Monks, A., Hursey, M.L., Czerwinski, M.J., Fine, D.L., Abbott, B.J., Mayo, J.G., Showmaker, R.H. and Boyde, M.R. (1988). Feasibility of drug screening with panels of human tumor cell lines using a microculture tetrazolium assay. *Cancer Res.* **48:** 589-601.

Baguley, B.C., Marshall, E.S. and Finlay, G.J. (1999). Short-term cultures of clinical tumour material: potential contributions to oncology research. *Oncol. Res.* **11:** 115-124.

Finlay, G.J., Baguley, B.C.. and Wilson, W.R. (1984) A semi-automated microculture method for investigating growth inhibitory effects of cytotoxic compounds on exponentially growing carcinoma cells. *Analyt. Biochem.* **139:** 272-277.

Newell, D.R., Burtles, S.S., Fox, B.W., Jodrell, D.I. and Connors, T.A. (1999). Evaluation of rodent-only toxicology for early clinical trials with novel cancer therapeutics. *Br. J. Cancer* **81:** 760-768.

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ANZCCART material provides assistance in Poland

Last February Dr habil. Andrzej Elzanowski, Chair of Vertebrate Zoology, University of Wroclaw, Poland approached me regarding the comprehensive method the late Dr Cam Reid and I developed to help investigators and animal ethics committees to assess the noxiousness of proposed experimental procedures. This method, including a "harm scale", was presented as a keynote paper (Mellor and Reid, 1994) at ANZCCART's Sydney conference, entitled *Improving the well-being of animals in the research environment*. A copy of this paper was provided to all members of the Polish National Ethics Committee to assist them to develop a system for managing the use of animals in research, teaching and testing. Recently Dr Elzanowski informed me that the ANZCCART system was recognised as excellent, provided good examples, and helped convince people of how important this issue is; however, it was deemed too sophisticated at present, but may well be adopted in the future when people get used to basics. In the event a more straightforward harm scale was adopted and is now being operated by 20 local ethics committees in Poland. It is good to know that ANZCCART-initiated activities can have benefits well beyond our own shores.

Heartened by this, I sent Dr Elzanowski details of the online resource developed in New Zealand by ANZCCART and the Animal Welfare Science and Bioethics Centre at Massey University, namely Using Animals in Science (HYPERLINK:http://anzccart.rsnz.govt.nz) He noted that it too had already been distributed to all members of the Polish National Ethics Committee and would soon be sent to the 20 local committees.

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Reference

Mellor, D.J. and Reid, C.S.W. (1994) *Concepts of animal well-being and predicting the impact of procedures on experimental animals.* In: *Improving the Well-being of Animals in the Research Environment*. ANZCCART, Adelaide. pp 3-18.

Animal experimentation legislation in Hong Kong

Introduction

The Department of Health currently administers the Hong Kong Special Administrative Region (HKSAR) animal experimentation legislation, entitled Animals (Control of Experiments) Ordinance, Chapter 340. The legislation was enacted in 1963, when there was only one university in Hong Kong and a handful of licensed researchers. There were essentially no private research institutions. In 1999 there were 733 licensed researchers, five universities regularly engaged in animal experimentation and a growing number of private research institutions.

Scientific advances since 1963 have created animal experimentation and animal welfare scenarios that are beyond the scope of the current legislation. Some examples of the broader issues that have developed include genetic manipulation in animals, altered public concepts about the validity and benefits of scientific research and changed community expectations about animal welfare.

Recent questions in the HKSAR Legislative Council and articles in the press indicate that the enforcement of the current legislation has been less than satisfactory. An example is the large discrepancy in the number of animals bred at the universities and the number of animals reported as used in research.

Problems with the current Ordinance

The current Ordinance and regulations are based on concepts of animal experimentation that are considered outdated in most western nations with whom the HKSAR trades. If products or techniques developed within the HKSAR as a result of experiments are offensive to these nations, Hong Kong's competitiveness may be harmed.

Other jurisdictions have confronted the ethical issues posed by animal experimentation. Subsequent community debate has resulted in solutions, such as formalised animal experimentation ethics committees (AECs). These have satisfied most members of the community that adequate protection was in place to ensure that animals were not abused. By moving away from the concept of licensing persons to undertake experiments and establishing formal ethical controls within the professional scientists who experimented with animals, the international and HKSAR communities should be satisfied that there are sufficient safeguards protecting animals used for scientific purposes.

Current licensing arrangements under Chapter 340 have a direct cost implication for the HKSAR Government. The licensing system requires human, financial and material resources to maintain. The demands on these resources have increased as the number of academic institutions and licensed researchers has grown over the past 30 years. Moving away from the concept of licensing persons to undertake experiments and establishing formal ethical controls within the professional scientists who experiment with animals would shift the burden of controlling experiments to the performers of the experiments i.e., to the researchers and the research institutions. Nonethe-less, with a shift to formal ethical control, the Government still maintains control over the procedures, guarantees that the proper protection of animals is in place, and does not have to tightly police the carrying out of experiments. This control is achieved by requiring:

- AECs in all research institutions;
- uniformity of structure of AECs;
- a code of practice for the use of animals in scientific procedures; and
- transparency of research efforts with community involvement.

There is considerable animal-based research being carried out between researchers in the HKSAR and Mainland China. Without appropriate ethical standards on the Mainland, much of that research is potentially subject to criticism and even rejection by peers in other countries. The enactment of modern legislation in the HKSAR that includes current ethical standards for animal experimentation will have a beneficial impact on the ethical standards of the collaborative institutions across the border.

The introduction of AECs would allow the responsible Department to maintain overall control of animal experimentation while giving the AECs an opportunity to independently and freely seek advice on veterinary issues from Government or independent veterinary experts. The transfer of responsibility for animal experiments to AECs would facilitate better Government, professional and community interaction, without the Government having to devote scarce resources. At the moment, compliance by researchers with the legislation is less than satisfactory. Enforcement of compliance by the Department of Health would require greater allocation of human, financial and material resources

All HKSAR universities that use animals for scientific purposes currently administer a system of AECs voluntarily, because the requirements under the legislation do not meet international norms. For research from HKSAR universities to be accepted by the international scientific community, it should be reviewed and approved by an AEC. Compliance with the requirements of the universities' AECs by researchers is excellent. The AECs are not uniform in their composition and do not have uniform guidelines under which to operate.

In effect, in the HKSAR, there are two systems monitoring animal experiments, one statutory system with poor enforcement but with legally binding guidelines and one voluntary system with poor uniformity and no universally accepted guidelines but with good compliance. However, as private research institutions establish themselves in the HKSAR, their willingness to establish AECs can not be assumed. These institutions may comply with legislation but if their sole purpose is in-house research rather than the international publishing of their research, there is no pressure for them to establish AECs and therefore no monitoring of animal welfare in their research protocols.

Recommendations

By revising the control of animal experimentation legislation this dual system could be replaced with a single system of AECs that have good guidelines which are legally enforceable, allowing easy and consistent compliance by researchers. This system would:

- allow the Government and universities to properly and uniformly administer research;

- assist the international reputation of HKSAR universities and researchers; and
- improve the welfare of animals used for scientific purposes by making research more transparent and accountable.

The best option for the HKSAR is for AECs to be made mandatory under any new legislation, which should define the constitution, membership and operating procedures of the committee as well as recognise a code of practice for the care and use of laboratory animals, to ensure uniformity of operation and transparency of proceedings. As Hong Kong does not have a Code of Practice for the care and use of animals for scientific purposes the HKSAR could consider adopting and modifying an existing Code of Practice.

In many jurisdictions which have AECs there is also an ongoing licensing system. There are several types of licensing system:

- licences for the researcher;
- licences the procedure or protocol;
- licences for the research institution; and
- any combination of the above.

Since there are fewer than 10 tertiary institutions in the HKSAR, of which only about half use animals for scientific purposes, it would seem logical to change the licensing system so that scientific establishments are licensed rather than the individual researchers. This would have minimum impact on Government resources while ensuring all research institutions and their researchers (academic, public or private) comply.

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Report on possible effects of cold and wind on sheep housed in the CSIRO Animal Production, Armidale, large animal house

In studies on the effects of cold on sheep, most attention has been focused on the ability of sheep to withstand extremes of cold, rather than the impact of cold on the comfort and welfare of the animals. Tolerance occurs when heat produced by the animal is able to prevent hypothermia as detected by a fall in body temperature below normal. The temperature at which tolerance breaks down has been termed the lower critical temperature LCT [Faichney *et al.,* (1976), Dechamps and Nicks (1986) Boe *et al.,* (1991) and Berge (1997)], and can be as low as -40ºC for sheep with long wool. In contrast to seeking the boundaries of tolerance, Berge (1997) notes that animal welfare is improved by avoiding extreme climate stress.

Heat loss and heat production have been the principal measurements used to predict the ability of sheep to tolerate inclement environmental conditions. Sheep have a capacity to respond to low ambient temperatures by increasing their heat production by up to 140% (Vermorel *et al.,* 1985), within the constraint provided by availability of feed. Heat loss is affected by climatic variables including temperature, wind speed and wetness, and by animal-dependent variables including surface area, wool length and wool type (Vermorel, 1985; Berge 1997).

Heat production by sheep under various climatic conditions (cold, wet, wind alone and mixtures of all),has been compared for rations meeting or exceeding maintenance [Vermorel *et al.,* (1985); Faichney *et. al.,* (1976), Berge (1991)]

Wind speed and floor types are important in determining the amount of heat housed sheep need to produce to maintain their body temperature, a measure described by Boe *et al.,* (1991) as environmental heat demand . These authors suggest that resistance to hypothermia is increased by previous exposure to cold. Intake of cold water can contribute to the environmental heat demand as perhaps does conductance of heat by steel mesh floors, which sheep prefer less than wooden slats (Boe *et al.,* 1991).

Data collection

During the period 2 July 1998 to 10 September 1998 a series of measurements was taken in the sheep holding facility at CSIRO Animal Production, Armidale NSW. The animal house is a corrugated iron shed with enclosed walls on the eastern, southern and western sides and with translucent sheeting on the northern wall. The shed is raised 1.8 metres above the ground on concrete pylons. Maximum and minimum temperatures and wind speeds at floor level and one metre above floor level were measured in the animal house and at a meteorological station 400 metres from the animal house. A maximum / minimum thermometer was used for recording the temperature extremes that occurred over intervals of two to seven days between each observation. A portable anemometer was used to measure wind speed over a period of 20-30 seconds at each site at the time temperatures were recorded. The maximum wind speed measured was recorded as the wind speed. Data were extracted from the official meteorological records for the research station for comparison.

Results

Thirteen records were obtained in the animal house.

The results indicate a temperature range at the meteorological station of -4.5ºC to 22ºC in the months July to September, 1998. Minimum temperatures for July and August were frequently 0ºC or below. Maximum temperatures for July were frequently less than 15ºC, and often below 10ºC. In August maximum temperatures were slightly higher while by September warmer days were evident. Occasional days in each of these months could be expected to be very cold for the whole day.

Wind speed measurements from the official record indicate the average wind speed for the 24 hours of measurement. It is not possible to determine the maximum wind speed on any day, using these records. The average wind speed ranges (official) were 0.2m / sec to 5.07m / sec. In the animal house surrounds estimated wind speeds were 0.6 to 3m / sec. At floor level speeds were 0.3 to 2m / sec, and at 1 metre from the floor 0.0 to 1.3m / sec. Wind speeds were always lower inside the animal house than immediately outside the building.

Wind speed can be used to calculate the wind chill factor, or the reduction in temperature at the skin surface with a wind blowing across it. On the day when the strongest wind speed was measured within the animal house, (if the speed at floor level and at one metre is averaged) the wind measured about 1.5 m / sec or 5.4 km / hr. The within-animal house temperature at the time was 6ºC. Therefore, the wind chill factor would have been 4.8ºC, i.e., the sheep at that level would be subject to a temperature at the skin level of 1.2 ºC. On the coldest day measured after subtracting the wind chill factor (ambient temperature = 5 ºC and wind

= 4.32 km/hr), sheep were exposed to an effective temperature of -0.2ºC If the strongest wind was blowing at the time of the lowest air temperature sheep would have been exposed to an effective temperature of -18ºC.

Discussion

Young (1981) has suggested that the "coldness" of an environment is determined by environmental factors:

- air temperature
- wind
- precipitation; and
- radiation exchange.

In combination these produce an effective ambient temperature for the animal. An animal can modify the rate of heat exchange through its behaviour (shelter seeking, postural changes) and by changing its thermal insulation (piloerection and vasomotor control of blood flow to superficial tissues). The length of wool on sheep will greatly vary the level of heat exchange.

There is a zone of thermoneutrality where the amount of heat produced by an animal is constant and not affected by the thermal environment. The lower border of that zone is called the LCT below which an animal is unable to increase its rate of heat production to maintain homeothermy (constant core body temperature). Both the size (mass) of the animal, which is related to heat production, and its surface area, which is related to the rate of heat loss, are important in this context. Obviously, the amount of thermal insulation (length of wool) will also affect the rate of heat loss and an animal's exposure to the effective ambient temperature.

The lowest effective ambient temperature which could be suggested during the period of measurement was about -18ºC. Figures from the literature reviewed suggest that for sheep with >40 mm of wool, and on adequate feed, the LCT is around -40ºC. If these factors alone are considered, conditions in the animal house at CSIRO Animal Production, Armidale seem to be lie within the boundaries tolerated by sheep. The ambient temperature would not often go below -5º C, and the building itself will reduce wind speeds to some extent. The welfare of sheep within these boundaries has not been assessed in this study. Hughes (1997) noted that "The zone of thermal comfort can be described as the thermal state which the animal will select for itself". For species such as sheep, most environments within the thermoneutral zone may be considered acceptable on welfare grounds (Hughes, 1997). The need for sheep to activate physiological means to increase heat production or loss while kept in the animal house might partially indicate the welfare cost of temperature extremes in that environment.

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References

Berge, E.. (1997) Housing of sheep in cold climates. *Livestock Prod. Sci.* **49:** 143-149.

Boe, K., Nedkvltne, J.J. and Austbo, D. (1991). The effect of different housing systems and feeding regimes on the performance and rectal temperature of sheep. *Animal Prod.* **53:** 331-337.

Dabiri, N., Holmes, C.W., McCutcheon, S.N., Parker, W.J. and Morris, S.T. (1995) Abstract: Resistance to cold stress in sheep shorn by cover comb or standard comb. *An. Sci.* **60:** 451-456.

Dechamps, P. and Nicks, B. (1986) Climate and habitat requirements for sheep. *Annals de Medicine Veterinaire* **130:** 320-342.

Faichney, G.J., Black, J.L. and Graham, N.M. (1976) Computer simulation of the feed requirements of shorn sheep. *NZ Soc. An. Prod.* **36:** 161-169.

Horton, G.M.J. (1978) Abstract: Lamb production, feed utilisation and haematologic and blood chemical changes in sheep exposed to cold. *Am. J. Vet. Res.* **39:**11 1845-1849.

Hughes, B.O. (1997) Health and disease In: *Animal Welfare*, Appleby, M.C. and Hughes, B.O. (Eds.) CAB International, London.

Linklater, K.A. (1983) Sheep housing and health. *Vet. Rec.* **113:** 560-564.

Slee, J., Wiener, G. and Woollams, C. (1988) Abstract: A comparison of inbred and outbred sheep on two planes of nutrition. 2. Response to acute cold and heat exposure. *An. Prod.* **46.**2: 221-229.

Vermorel, M., Hocquette, J.F. and Bouse, J. (1985) Suitability of different sheep breeds to transhumance: resistance to inclement weather. *Journees de la recherche Ovine et Caprine,* **10:** 292-306.

Young, B.A. (1991) Cold stress as it affects animal production. *J. Anim. Sci.* **52:** 154-163.

Coming up

ANZSLAS Conference
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ANZCCART Animal Welfare Officers' Workshop
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Adelaide
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9th International Congress on Toxicology
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News

Internet Libraries

Three university libraries open new agricultural internet gateway

The libraries of the universities of Melbourne, Adelaide and Queensland, plus that of the CSIRO, have set up a new web-based agricultural research information gateway called AGRIGATE. Planning for the project began in 1998 and the website went online last July but was formally launched at the University of Melbourne during May this year.

Using a searchable database, researchers, agricultural workers and students have free access to a wide range of information. Resources are selected by an editorial panel of specialist librarians and members of the agriculture research community.

Funded in part by a grant from the Australian Research Council, the web site is aimed at Australian researchers. While a powerful tool for the research community, the database is also likely to be of use to hands-on agricultural practitioners, as well as students, even at high school level. The emphasis is on research in Australia but overseas users are also likely to find this resource of great benefit.

Users can access information in the database in three ways: by browsing through a list of broad categories and cross terms, through an index of subject headings, or via a search facility. Whichever method is selected, the database provides a wealth of information at no charge.

The gateway began with a set of 100 entries and now has nearly 300 catalogued under 13 broad categories. Within each are hundreds of subject words (such as taxonomy, soil testing and genetic resources) grouping resources of similar content.

As new resources were added, a weekly What's New list will be generated. Anyone wanting to receive this list as well as being kept up to date with changes on the site, can join the AGRIGATE Updates mailing list. To subscribe, users fill out an online subscription form.

The project will be evaluated to ensure it provides the best possible service. Part of the evaluation is an online site evaluation and survey running to mid-December. It asks users for their reactions to the materials and functionality of the site. AGRIGATE hopes to hear from contributors in agriculture research fields not currently covered in its resource listing, particularly those directed toward Australian needs and conditions.

The AGRIGATE website is at http://www.agrigate.edu.au

Phone: (03) 8344 5717
Fax: (03) 9347 7243 or
email:
agrigate@agrigate.edu.au

Veterinary Anaesthesia and Analgesia

— a new journal

This is the only international journal devoted to veterinary anaesthesia and analgesia, promoting discussion and debate on all branches of anaesthesia and the relief of pain in animals. It is the official journal of the Association of Veterinary Anaesthetists, the American College of Veterinary Anesthesiologists and the European College of Veterinary Anaesthesia. Its purpose is the publication of original, peer-reviewed articles covering all branches of anaesthesia and the relief of pain in animals.

The journal offers a unique blend of scientific reviews on aspects of pain relief in animals and news of important or emerging issues in this field. It is an invaluable forum for all those involved in the study, clinical practice or teaching of veterinary anaesthesia and for those with an interest in related subjects such as physiology and pharmacology.

Veterinary Anaesthesia and Analgesia will be published twice in 2000 (January and July), with three issues in 2001 and four issues from 2002 onwards.

For further information and subscription details contact:
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New Animal Science Database

CABI Publishing have created a new animal science database (animalscience.com), which has as its core a subset of CAB ABSTRACTS database with linkage to full text articles.

Animals covered include all economically important farmed animals (including fish) as well as pets, wild animals and zoo animals. All aspects of animal science and veterinary medicine are included. Research on breeding, genetics, nutrition and husbandry, dairy technology, management and biotechnology of economically valuable animals and of laboratory species relevant to agriculture are also covered.

For a full subject listing and to register for a free trial of this database, visit the website at:

www.animalscience.com

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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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