

Animal Welfare: General Concepts

Background

The animal welfare movement has been with us for approximately 200 years. Laws concerning the treatment of animals were passed in many countries in the early 1800's. Numerous animal welfare societies, such as the various Societies for the Prevention of Cruelty to Animals, were also formed at that time. Until the 1960's most welfare issues related to acts of deliberate cruelty or abject neglect. In the case of farm animals, the most significant legislation addressed humane slaughter and long distance transportation. Although some systems of intensive animals production have been in existence for over a century, there was a rapid increase in the use of such methods following World War II. This widespread adoption of intensive methods gave rise to a book that would have a profound effect on farm animal welfare concerns.

Ruth Harrison's *Animal Machines*, published in 1964, criticized the intensive animal production systems developing in the United Kingdom on several issues. These included the use of antibiotics, intensive feeding programs, indoor animal production and space restriction. As a result of this publication, the British government commissioned an enquiry into intensive animal production, generally referred to as the Brambell Report (Command Paper 2836, 1965). This committee made a number of very significant and often insightful contributions to the issue of farm animal welfare. It included the concept of mental well-being, as well as physical, in its description of welfare. The committee also indicated, based on their structure, function and behaviour, that animals likely experience many of the same feelings as do we, but differing in intensity. In addressing the crowding and degree of confinement to which Harrison objected, the committee concluded that animals '*should be able, without difficulty, be able to stand up, lie down, turn around, stretch its limbs and interact with others*'. The report also identified most of the concepts that were later incorporated into the Five Freedoms of Animal Welfare by the Farm Animal Welfare Council (1992), whose establishment itself was recommended by the committee.

Various conceptual frameworks as to how to best define and/or assess animal welfare have been developed following the publication of the Brambell Report. Three of these were presented at major conferences in both North America and Europe in 1991 and 1994, respectively. Moberg (1993, 1996) suggested that animal welfare be viewed as a type of risk assessment. The risks being that animals would become ill, perform poorly, fail to reproduce or even die. When an animal's behaviour or biological functions are affected to such a degree that these risks are probable, the animal's welfare is compromised. Broom (1993, 1996) maintains that welfare should be seen as an animal's state in regards to its attempts to cope with its environment. Any evidence of attempting to cope with the environment, whether successful or not, would be reflective of an animal's welfare. Welfare is seen as a continuum, ranging from very poor to very good, and the ethical question becomes one of what level of welfare is considered acceptable. The third view of animal welfare maintains that it is the animal's mental perception of its condition that defines its welfare, and that health and physical condition are only of relevance if they reflect an animal's feelings (Duncan, 1993, 1996). All of these approaches would reach the same conclusion in most cases in which the animal's welfare would be considered poor. Yet each would emphasize different means of assessment and interpretation of those conditions. The literature on general concepts of animal welfare published during the last five years builds upon these three approaches.

General Concepts

Two of the papers reviewed attempt to use learning techniques to assess the mental state of animals. Rushen (1996) reviews the use of aversion learning in which an animal chooses to avoid conditions that induce some degree of suffering. The strength of this response can be used to infer the degree of suffering encountered. A second method of using learning techniques is to train animals to choose a response based on the presence or absence of anxiety (Carey and Fry, 1995). After training pigs to choose a particular response when treated with an anxiety inducing drug, the animals were exposed to other potential anxiety causing conditions. In general, when exposed to anxiety causing conditions, pigs choose the response that they had been trained to use when induced into anxiety. Both of these methods are means of getting the animal to indicate how unpleasant a situation is.

The 'feelings' definition of welfare requires that animals possess some degree of sentience (mental awareness). The degree to which animal welfare can become a social concern depends upon whether or not humans perceive that animals have such capabilities. Davis and Cheeke (1998) surveyed faculty, staff and students at an American university and reported that the majority of people believe animals have minds and mental capacities. Thus, animal welfare is likely to be a social concern among this segment of the population.

Establishing Policy

The British Society of Animal Science published a symposium on establishing animal welfare policy (Russel et al., 1999). Edwards et al (1999) addressed the issue of research and its influence on welfare legislation. The authors indicated that there is a tendency to legislate on housing systems rather than on animal state. The means to correct this situation is for more basic research on animal welfare to be conducted and the results used to establish legislative criteria of acceptable and unacceptable welfare. There should be a movement away from housing standards to welfare standards, and welfare scientists should be active in their development.

An American viewpoint on the role of animal scientists in animal welfare was presented by Swanson (1995). She concluded that animal scientists are in a position to improve the short-term and long-term well-being of farm animals provided they have professional, administrative and public support. This paper identifies approaches that have been developed and used within agricultural research to recognize and solve animal welfare problems. A similar review of methods used to assess animal welfare was prepared by Waran (1996). Again, several issues were identified, but the conclusion was that scientists have the capability to provide realistic and workable results.

Within the U.K., the Farm Animal Welfare council has established a number of principles of farm animal welfare and has published Codes of Practice for each species. These recommendations came about due to economic, political and social forces. Some major aspects of animal welfare, such as alternative housing for pigs and poultry, remain unresolved and require more research (Whittemore, 1995). Thus, all of these authors have concluded that animal welfare research is important in making appropriate policy. In many cases however, policy has already been established and it may not be such that the best standards of welfare are achieved.

General agricultural policy within the European Union is established in the Common Agricultural Policy. These policies may impinge on animal welfare even when that is not the primary intent. Winter et al.,(1998) examined the impact of these agricultural policies on animal welfare within the dairy and pig industries. They concluded that some structural changes encouraged in these industries due to subsidies and land use restrictions were detrimental to animal welfare. The impact of policy changes on animal welfare should be considered, even when the policies do not directly address welfare issues.

An example of combining various factors into agricultural policy was described by Juga (1998). The Nordic breeding program for dairy cattle has included consideration of ecological and ethical factors as well as economic. As a result, genetic progress in terms of production traits

was accomplished without losses of functional or fitness traits. A similar combination of welfare and production science has been employed in Switzerland (Wechsler et al., 1997). Newly developed animal housing systems cannot be advertised or installed until the Federal Council has authorized them. In some cases this involves a series of practical tests assessing animal welfare. The authors conclude that applied ethologists should be involved in the development of new systems as well as in their assessment.

Animal Handling and Transport

Handling and transport have been recognized as critical processes affect animal welfare. Most species chapters include reviews of research in these areas. Several general articles were also published that are applicable to all species. The welfare of animals during handling and transport can be improved by actions at several levels. Taking a very broad approach, Wariss (1996) suggested that these could include: legislation, to define acceptable and unacceptable practices; research and development, to develop new methods that improve welfare; and, education, that stresses that good welfare equates to increased profitability. Expanding on the area of research and development, Cockram and Mitchell (1999) discussed how research should be directed towards: improvement in equipment design and function; improvement in transport practices; informed policy, legislation and codes of practice; and, education of those involved. Specifically, researchers are encouraged to determine those components of transport environments and practices that constitute a major risk to animal welfare, and what the optimum conditions are for transport.

Broom (1996) listed a number of suggestions to ensure a high degree of welfare during transportation of animals. These include: consider transport and handling when designing housing; provide human contact to animals prior to handling to reduce their fear of humans; avoid social mixing; handle carefully, avoiding painful or damaging methods; provide good loading facilities; avoid high stocking densities; improve vehicle design; and, limit the length of journeys.

A series of very practical papers were published by Grandin relating to animal handling. In an early paper (Grandin, 1983) she indicated that animal welfare could be improved by: having solid side fences on ramps, crowd pens and races; having one way traffic flow at slaughter plants; and, penalizing abusive handlers. Addressing animal factors that affect the level of stress during handling, Grandin (1997) addresses the animal's previous experience and genetic predisposition. She recommends using a combination of behavioural and physiological measurements when assessing overall animal discomfort. Extending this approach to handling and stunning practices at slaughter plants, Grandin (1998a) outlines methods she has used to assess the quality of handling in a number of commercial plants. These include: stunning efficiency; insensibility on the bleeding rail; vocalization; electric prod use; and, numbers of animal slipping and falling. Applying a systematic assessment of handling using these criteria, problems were identified and later corrected at a number of slaughter plants. Finally, addressing the problem of downer animals at slaughter plants, Grandin (1998b) provides recommendations for the prevention of downers at both the farm and slaughter plant, suggests appropriate handling methods for such animals, and encouraged development and implementation of stronger policies on downers.

Other Issues

The pain involved in various management practices is addressed within the species chapters. Two review articles, addressing general implications of pain in farm animals, were reviewed. Otto and Short (1998) addressed the issue of pain, particularly following surgery or during wound healing. Their paper identifies behavioural and physiological indicators of pain and appropriate drugs to manage it. Bath (1998) discussed the pain involved in management procedures. To minimize such pain, he suggested that farm managers should ensure that: the

procedure is done for appropriate reasons; it is done by the best method; the correct equipment is used; it is done at the right time; it is done to the right class of animal; correct follow-up is carried out; and, that the persons involved are properly trained.

Fear is a significant determinant of animal welfare and Rushen et al., (1999) addressed this topic. The stressfulness of various procedures and animal handling in general can be improved if precautions are taken to prevent or alleviate fear. Their suggestions include increasing the contact of the animals with humans under non-fearful conditions, improving the design of handling facilities, and avoiding aversive treatments as much as possible.

Environmental enrichment is a means of improving animal health or physiological function, decreasing abnormal or stereotypic behaviours, and increasing the range of normal behaviour in confined animals (Mench et al., 1998). Their paper discusses types of enrichment used for poultry, pigs and cattle. These include dustbathing material for hens, straw for pigs, and scratching posts for cattle.

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Abstract or Summary of Interesting Publications

Brambell,F.W.R. 1965. Report of the Technical Committee to Enquire into the Welfare of Animals kept under Intensive Livestock Husbandry Systems. Her Majesty's Stationery Office, London.

This report was commissioned by the British government in response to the publication of Ruth Harrison's book on the developing intensive animal agriculture. It was specifically focused on animal welfare, as opposed to the use of antibiotics and other issues raised by Harrison. The various chapters cover an introduction to the issue, the development of intensive methods, animal welfare legislation, animal welfare, the production of various species, the importance of stockmanship and a number of recommendations. The importance of this document is evident in the continuing emphasis within today's discussion on welfare, of issues and concepts raised by the committee. The chapter on the welfare of animals has been particularly influential. This chapter includes an emphasis on both the physical and mental well-being of the animal, and discusses the importance of animal feelings to animal welfare. It is often cited for its 'five freedoms', that is, 'An animal should at least have sufficient freedom of movement to be able without difficulty, to turn round, groom itself, get up, lie down and stretch its limbs.' In some way it also addresses all of the new five freedoms later put forth by the Farm Animal Welfare Council (FAWC).

Carey,M.P. and Fry,J.P. 1995. Evaluation of animal welfare by the self-expression of an anxiety state. *Laboratory Animals* 29:370-379.

Previous behavioural studies to alleviate suffering in farm animals have either manipulated environments or relied on the subjects learning to modify their environment. Indirect measures of suffering can also be made by monitoring activity of the sympathetic nervous system, as well as cardiovascular and metabolic responses. In this study, pigs were trained to discriminate between the effects of pentylenetetrazole (PTZ), which causes anxiety in man, and saline. Then they were subjected to a variety of aversive stimuli that might normally be encountered on a farm or abattoir, and their responses examined. The study found that there are individual differences in anxiety responses. However, this approach reduces the imposition of human values by providing the animal with a direct means of expressing its own psychological state. Therefore, this method provides a valuable scientific tool for future studies of animal welfare.

Cockram,M.S., Mitchell,R.W. 1999. Role of research in the formation of 'rules' to protect the welfare of farm animals during road transportation. Pages 43-64 in A.J.F.Russel, C.A.Morgan, C.J.Savory, M.C.Appleby, T.L.J.Lawrence, eds. *Farm Animal Welfare-who writes the rules*. 23 ed. British Society of Animal Science.

'Rules' to protect the welfare of animals during transport should be based on scientific evidence relating to the animals' physiological and behavioural requirements and their interaction with their immediate environment. This paper explains how research can contribute to an understanding of the welfare issues associated with transportation. However, it also indicates the limitations of existing research methodology. Research should provide the sound scientific basis for:

- a) improvements in transporter design and function
- b) improvements in transport practices

- c) informed policy, legislation and codes of practice
- d) education of those involved in every aspect of the animals' life

To achieve these aims research must:

- a) Identify and quantify those components of transport environments and practices that constitute the major risk to the welfare and survival of animals during journeys.
- b) Determine the optimum conditions for transportation and identify 'best practice' based upon matching the conditions and procedures to the animals' biological requirements.

The research should accurately reflect commercial practice and co-operation between scientific groups and the animal production and transport industries is essential for this to work.

Mench, J.A., Morrow-Tesch, J., Chu, L. 1998. Environmental enrichment for farm animals. *Lab Animal* 27:32

Research over the past 20 years has demonstrated that environmental enrichment can improve the physical and psychological well-being of livestock and poultry. Some benefits of successful enrichment programs may include improvements in health or physiological function, decreased abnormal or stereotyped behaviours, and increased range of normal behaviour. This paper focused on social, object and housing enrichments for various species. Social housing is an important form of enrichment for farm animals. However, efforts should be made to minimize aggression, cannibalism, feather-pecking and tail-biting, problems that can arise in social groups. Other important factors include adequate feeder, floor, and water space, as well as enclosure configuration and space. There are a number of enrichment techniques that can be used for chickens. These include providing perches, nestboxes, and dustbathing material, as well as some form of cover and material in which they can forage. For swine, providing straw can increase comfort and provide an opportunity for recreation. Manipulative objects have proven successful with swine, allowing expression of highly motivated oral activities that would otherwise be directed towards pen-mates and pen fixtures. In cattle, scratching posts or brushes may be appropriate enrichment devices. This paper concludes that environmental enrichment can lead to improvements in health, productivity, and behaviour.

