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Science, ethics and public concern about animal welfare.

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1. Welfare

The scientific study of animal welfare has developed rapidly during the last fifteen years. The concepts have been refined and a range of methods of assessment have been developed.

Substantial challenges to animal functioning include those resulting from: pathogens, tissue damage, attack or threat of attack by a conspecific or predator, other social competition, complexity of information processing in a situation where an individual receives excessive stimulation, lack of key stimuli such as a teat for a young mammal or those associated with social contact for a social animal, lack of overall stimulation, and inability to control interactions with the environment. Hence potentially damaging challenges may come from the environment outside the body, e.g. many pathogens or causes of tissue damage, or from within it, e.g. anxiety, boredom or frustration which come from the environment of a control system. Systems that respond to or prepare for challenges are coping systems and coping means having control of mental and bodily stability (Broom and Johnson 1993). Coping attempts may be unsuccessful, in that such control is not achieved, but as soon as there is control, the individual is coping. Systems for attempting to cope with challenge may respond to short-term or long-term problems, or sometimes to both. The responses to challenge may involve activity in parts of the brain, various endocrine, immunological or other physiological responses as well as behaviour. However, the more that we learn about these responses, the clearer it becomes that these various types of response are inter-dependent. For example, not only do brain changes regulate bodily coping responses but adrenal changes have several consequences for brain function, lymphocytes have opioid receptors and a potential for altering brain activity, heart-rate changes can be used to regulate mental state and hence further responses.

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Some coping systems include feelings as a part of their functioning but other high or low level brain processes and other aspects of body functioning are also a part of attempts to cope with challenge. In order to understand coping systems in humans and other species it is necessary to study a wide range of mechanisms including complex brain functioning as well as simpler systems. Investigations of how easy or difficult it is for the individual to cope with the environment and of how great is the impact of positive or negative aspects of the environment on the individual, are investigations of welfare. The welfare of an individual is its state as regards its attempts to cope with its environment and this includes feelings and health (Broom 1986, 1996, 1998). Welfare is a characteristic of an individual at a certain time and the state of the individual can be assessed so welfare will vary on a range from very good to very poor. Welfare concerns how well the individual fares, or goes through life. . Equivalent words in other languages include bien-être, bienestar, bem estar, benessere, Wohlergehen, welzijn, velfærd, and dobrostan. Health, like welfare, can be qualified as good or poor and varies over a range. It refers to body systems, including those in the brain, which combat pathogens, tissue damage, or physiological disorder. All of this is encompassed within the broader term welfare so health is a part of welfare.

The assessment of welfare (Broom and Johnson 1993) should be carried out in an objective way, taking no account of any ethical questions about the systems, practices or conditions for individuals which are being compared. Once the scientific evidence about welfare has been obtained, ethical decisions can be taken. Much of the evidence used in welfare assessment indicates the extent of the problems of individuals but it is also important to recognise and assess good welfare, i.e. happiness, contentment, control of interactions with the environment and possibilities to exploit abilities. Good welfare in general, and a positive status in each of the various coping systems, should have effects which are a part of a positive reinforcement system, just as poor welfare is associated with various negative reinforcers. Good welfare should have various recognisable effects on individuals. We need to identify these so that the assessment of welfare is as effective at the good end of the range as at the bad end.

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2. Stress

Most people who speak of stress refer to a situation in which an individual is subjected to a potentially or actually damaging effect of its environment. However, the usage of the term by many people, including Selye (1950, 1976) has been confusing. Stress has been referred to as an environmental change which affects an organism, as the process of affecting the organism or as the consequences of effects on the organism. It has been limited to one kind of physiological response mechanism hypothalamic-pituitary-adrenal cortex (HPA) activity, or to mental rather than physiological responses or has been regarded as a much more wide ranging phenomenon. Knowledge of the functioning of the HPA axis led some people to assume that stress can be equated with activity in this system. It was assumed that HPA activity occurred during all challenges to effective functioning and control within the individual but this was demonstrated to be untrue by Mason (1971) and many other studies. It is also well known that HPA activity is temporarily increased during courtship, mating, active prey catching and active social interaction, none of which would be considered to be stressful by the majority of the general public or of scientists. To equate stress with HPA axis activity renders the word redundant because we can refer directly to HPA activity in a general or a specific way. Hence this usage of the term stress to refer only to HPA activity is considered unscientific and unnecessary by most scientists working in the area. Another meaning which has been ascribed to stress makes it largely synonymous with stimulation. If every impact of the environment on an organism is called stress, then the term has no value. Many stimuli which affect individuals in beneficial ways would never be called stressors by most people.

Stress is an environmental effect on an individual which overtaxes its control systems and results in adverse consequences, eventually reduced fitness (Broom and Johnson 1993 modified after Broom 1983). The ultimate measure of fitness is the number of offspring reaching future generations and there are many different ways in which challenges overtax control systems and have such effects. The environmental variable which has the effect on the individual can be called a stressor. Stress can have a variety of short-term and long-term effects including metabolic changes, cardiovascular

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malfunction, immunosuppression, increased incidence of parasitic bacterial and viral diseases as well as psychological disorders such as interludes of panic, anxiety or depression. Using this definition, stress may or may not involve the activation of the HPA axis but stress is never good for an individual. If the eventual effect is good, it is stimulation or challenge but not stress. These concepts discussed further by Broom (2001) and by Broom and Johnson (1993).

3. Public concern and attitudes in the farming industry

Public concern about animal welfare has increased in many countries during the last thirty years and especially in the last ten years. Evidence of this is summarized in Table 1.

Table 1 - Evidence for increased concern about animal welfare.

1.	Letters from the public, media coverage.
2.	References in parliamentary discussions and government statements.
3.	Requests for scientific evidence concerning animal welfare.
4.	Activity of scientific and other advisory committees.
5.	Funding of scientific research on animal welfare.
6.	Increased teaching and conferences.
7.	More legislation.

(from Broom 1999)

The ethical basis of this is that we have obligations to all animals which we use, one of which is to ensure that welfare is not very poor.

People who run or work on farms are influenced by a variety of factors when they are deciding on their housing and management policies and when they are executing these policies. They are involved in a commercial enterprise and will be endeavouring to make a profit so the monetary costs which they incur and the potential financial returns which they are likely to get for their product will be factors of major importance to them. Some other costs to the industry exist, for example, consumers who do not like some aspect of

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production may refuse to buy the product (Broom 1994). These costs are often ignored by individual farmers.

Attitudes of animal users depend upon early training, traditional practices, acquisition of knowledge from others subsequent to any training, personal experience and general beliefs and philosophy. Training did not, until recently, include much information about animal welfare except where it impinged on profitability. Even diseases were often mentioned in agriculture training only in relation to effects on growth, offspring production or product quantity and quality. Recent training courses are more likely to have included information about the welfare of the animals and most agricultural trade journals nowadays do cover animal welfare issues. Traditional practices are often deemed by farmers to be right for the sole reason that "this is the way that we have always done it". Some of these methods are the best ones for good welfare but in a time of changing attitudes to animals, such arguments are untenable.

Farmers and other animal users have to live with their families, friends and neighbours. If these people are critical of the effects on the welfare of animals of the methods used, the farmer may change these methods. In some cases, the animals are very obvious to all who pass by the farm. If a sheep or cattle farmer has many animals which are noticeably lame, there will be a considerable likelihood that someone will comment on this to the farmer. Farmers do not like to be thought incompetent or uncaring, so they may respond to such comments by giving the animals veterinary treatment or changing the management system so as to avoid lameness. If the animals are inside a building or otherwise hidden from public view, the number of people who might comment on poor welfare will be smaller and there is a greater chance that the farmer can persuade himself or herself that there are no significant welfare problems.

Meetings with others in the same business and trade magazines will tend to help farmers and others to arrive at common views about their various problems. A farmer who has to reconcile himself or herself to poor welfare in some animals will find it easier to do so with the support of others. Such

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influences will tend to slow down change towards better welfare in the animals if economic factors mitigate against such change.

The views of the general public are largely made known to farmers and others involved in animal production via the media. There is frequent coverage of animal welfare issues in newspapers, on radio and on the television and this, by bringing scientific knowledge about animal complexity to the attention of most people, affects the attitudes of people and then comes to represent it. Farmers see themselves portrayed as uncaring in some respects. They are unfairly portrayed on some occasions but other portrayals are correct and the farmer cannot hide from them by retreating physically into buildings and socially into a farming only society. When public demonstrations about animal welfare issues occur, farmers cannot ignore these. The demonstrations by great numbers of largely orderly and apparently normal people against the shipping of calves to conditions which were illegal within the United Kingdom, had a big influence on farmers and politicians alike. It is not the most vociferous people, who are sometimes rather extreme in their views, who have the greatest influence on animal users or politicians but the moderate people who represent a groundswell of public opinion. In many recent surveys in Europe, animal welfare has been shown to be an important issue for the general public. For example about three quarters of people questioned in France regarded animal welfare as a problem affecting their purchasing of veal or eggs (Ouedraogo 1998) and 34% of 420 schoolgirls questioned in Dublin stated that they avoided eating meat, principally (53%) for animal welfare rather than nutrition (29%) reasons (Ryan 1997).

4. Legislation effects on welfare

Legislation has effects on how people house and manage animals but several other factors also affect this. Codes of practice produced by governments, the animal production industry, or companies which purchase the products from farmers and sell them to the public have an effect. So too do other factors which help to form the attitudes of the people who construct animal accommodation, own animals, manage units, care for animals on a day to

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day basis, transport animals, handle animals in markets, or slaughter animals.

Legislation is generally initiated by pressure from voters on elected politicians. The politicians would usually seek advice from civil servants before formulating new legislation. In recent years, whenever any legislation on animal welfare is proposed, advice is sought from committees or working groups of scientists. The non-government organisations who lobby the politicians, whether they are producers' organisations or animal protection organisations, will have some access to scientific advice so it is important for the legislators to know the latest state of scientific knowledge on the subject. As a consequence, the European Union has set up, via the European Commission, scientific committees on a range of subjects. The former committees were the Scientific Veterinary Committee, Animal Welfare Section and the Scientific Committee on Animal Health and Animal Welfare. The present committee is the European Food Safety Authority Panel on Animal Health and Welfare.

Legislation within European countries and E.U. Directives and Regulations have usually been preceded by Recommendations from Council of Europe committees such as the Standing Committee of the European Convention on the Protection of Animals Kept for Farming Purposes. This last Committee has produced Recommendations on: poultry kept for egg production, pigs, cattle, fur animals, sheep, goats, chickens kept for meat production and ducks. The information in the Convention and Recommendations has formed the basis for legislation and codes of practice in many countries.

The actual effect of legislation on the welfare of animals depends upon the responses of those owning and managing the animals. This response, in turn, depends upon the nature of any enforcement. Some systems for farm animal production will not continue if they are made illegal because they depend upon large manufacturers who are easily forced to change to a legal system. Other aspects of legislation can be enforced only by checks on farm, transport vehicles, markets, slaughterhouses etc. and the extent of law-breaking will be significantly affected by the frequency and quality of the checks. For many transgressions, unannounced inspections are necessary if

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transgressors are to be discovered. There are regional and national differences in the extent to which legislation is viewed seriously by those involved in the animal production business. The general direction of movement within the European Union in this respect is towards better enforcement in all member states because it is manifestly unfair for there to be significant differences in the extent of compliance with the laws.

5. Retailer-produced codes of practice

Farmers often sell animals or their production of milk, eggs etc. to single purchasers who represent large retail chains or wholesale distribution companies. The increase in direct selling to supermarket chains has led to considerable power being placed in the hands of these supermarket companies. It is possible for these purchasers to lay down conditions for animal production and to enforce these by inspection. The standards set by the supermarket chains are determined by what people will buy and by their reputation with the public.

The public image of large companies which retail food, including supermarket chains and fast-food companies, is of great importance to them. Bad publicity because of a risk to public health, a risk to the environment or the occurrence of poor welfare at any stage of the production process can be very damaging. Hence it is in the interest of such food companies to avoid any scandal which might threaten their good image. When these companies receive many letters from consumers complaining about a product which they sell, they have to take notice of the points which are being made.

As a consequence of consumer pressure, food retail companies are adopting standards which they impose on their suppliers. In some cases, these standards are quite simple, for example Albert Hein in the Netherlands and elsewhere limited their sales of eggs to "scharreleie" which meant that the hens were reared in conditions where they could scratch in litter. Marks and Spencer in the U.K. and elsewhere stopped selling eggs from battery cages. In other cases, elaborate standards have been described in detail and sent to suppliers. One of the first systematic attempts to provide comprehensive information about the conditions under which animals were kept in the

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course of food production was the "Freedom Foods" scheme run by the R.S.P.C.A. in the U.K. In this scheme, the standards for housing and management have been set by a widely respected animal protection society and farms are inspected by Freedom Foods staff. Retailers who subscribe to the scheme are allowed to use the Freedom Foods logo which is accepted as honest by the purchasing public. Acceptance, by the public, of products which are produced in such a way that the welfare of the animals is good, depends upon trust in the organisation which is carrying out the labelling and inspection. Some large supermarket chains and other food retailers are trusted because it is thought that they could not afford to be found out if they were not labelling and policing adequately. Animal protection groups are trusted in this respect and their label is a valuable asset for some retail companies. A recent development in this area is the announcement by MacDonaldis fast-food chain in the U.S.A. of standards for the welfare of hens which produce their eggs, including increased space allowance and the banning of forced moulting.

The enforcement of standards by food retailers has led to substantial changes in the welfare of animals on farms because every producer has to conform to the standards in order to sell their products. The rapid development of such schemes in several countries has, in general, been based on scientific evidence about animal welfare.

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