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Chapter 3

International Perspectives on Animal Welfare Science and Policy Including Whale Welfare and the E.U. Seal Product Ban: Animal Welfare as a W.T.O. Public Morality Issue.

Donald M. Broom

Donald M. Broom,
Centre for Animal Welfare and Anthrozoology,
Department of Veterinary Medicine, University of Cambridge,
Cambridge U.K.
Email: dmb16@cam.ac.uk

Abstract Most people consider that we have moral obligations to other people, to animals of other species and to ensuring the sustainability of production systems. A system or procedure is sustainable if it is acceptable now and if its expected future effects are acceptable, in particular in relation to resource availability, consequences of functioning and morality of action. Animal welfare affects public acceptability of animal usage systems and hence sustainability. The concept of animal product quality now includes: the health of human consumers, the welfare of animals used, environmental impact including conservation and pollution, the efficiency of usage of world food resources, the use of genetically modified organisms, ensuring fair payment for poor producers, and preserving rural communities. Consumers may refuse to buy unacceptable products and may pressurise retail companies and governments to ensure that they are not sold. Hence there must be codes or laws and inspection using, for example, animal-based welfare-outcome indicators. EFSA reports, which are commissioned before all changes in E.U. animal welfare legislation, have pioneered precise review of animal welfare issues and rigorous analysis of risks of poor welfare and benefits to good welfare. The best general laws on animal welfare include a requirement for a duty of care for the animals. Welfare is now discussed in the International Whaling Commission. The W.T.O. has rejected a challenge to the E.U. legislation that banned seal products because of inhumane killing procedures, the first time that it has accepted animal welfare as an aspect of public morality that can be grounds for trade restriction.

1 Introduction

1.1 Human Obligations to Animals

Moral systems have evolved, in humans and other species, because cooperation and tolerance are successful strategies, especially in social species (Broom, 2003). Most people would say that we have moral obligations to humans and animals of other species. If we use a living animal in a way that gives us some benefit, we have an obligation to that animal. It is my view that human behaviour and laws should be based on the obligations of each person to act in an acceptable way towards each other person and to each animal that is used. It is better to base strategies for living on our obligations rather than to involve the concept of rights because some so-called rights can result in harm to others.

With increasing knowledge and increasing efficacy of communication there has been a change in attitudes to people with a broadening of the range of people for whom we have concerns. We also now consider that a wide range of animals deserve moral consideration. One view of animal protection occurs because the animals are considered to have some intrinsic value. For many people, certain animals are valued because of evidence for their cognitive abilities, their awareness, mental aspects of their needs and the feelings that they can have, e.g. pain, fear and pleasure (Verrinder et al, Chapter 4 this volume). Animals vary in the extent to which they are aware of themselves (DeGrazia, 1996) and of their interactions with their environment, including their ability to experience pleasurable states such as happiness and aversive states such as pain, fear and grief. The concept of sentience affects our decisions about which animals to protect. A sentient being is one that has some ability: to evaluate the actions of others in relation to itself and third parties, to remember some of its own actions and their consequences, to assess risk, to have some feelings and to have some degree of awareness (Broom, 2006, 2014).

People are more likely to want to protect those animals that are sentient. Human opinion as to which individuals are sentient has changed over time in well-educated societies to encompass, first all humans instead of just a subset of humans, and then also: (a) certain mammals that were kept as companions, (b) animals that seemed most similar to humans e.g. monkeys, (c) the larger mammals, (d) all mammals, (e) all warm blooded animals, (f) all vertebrates and (g) some invertebrates. New knowledge about brain function and welfare has tended to show that the abilities and functioning of non-human animals are more complex than had previously been assumed so there should be some re-appraisal of which animals should be protected (EFSA, 2005; Broom, 2007b, 2014).

One obligation to an animal that is used by humans (Broom 2003) is to avoid causing poor welfare in the animal except where to do so would lead to net benefit to that animal, e.g. vaccinating it against disease, or to other animals including humans, or to

the environment, e.g. excluding from an area or killing disease transmitters or predators. Hence some aims in animal protection are associated with concerns about animal welfare. We can consider the welfare of all living animals, including humans, but the term is not applicable to inanimate objects, plants, bacteria or viruses. Every living organism is likely to be the subject of more reverence than an inanimate object because living organisms are qualitatively different from inanimate objects in complexity, potential and aesthetic quality. This can affect decisions about whether to kill the organism and whether to conserve such organisms. Animals can respond adaptively and behave using neural control so their welfare can be evaluated.

The welfare of an animal is its state as regards its attempts to cope with its environment (Broom, 1986). Welfare is a characteristic of an individual animal whilst animal protection is a human activity. Welfare includes both the ease of coping, or difficulty in coping, and any failure to cope. It varies over a range from very good to very poor and can be evaluated scientifically (Broom and Johnson, 2000; Fraser, 2008; Broom, 2008, Broom and Fraser, 2015). Coping mechanisms can be physiological, behavioural, brain systems including those that lead to feelings, and responses to pathology. Most feelings, for example pain, fear, eating pleasure, sexual pleasure, are adaptive and are components of the mechanisms for attempting to cope with the environment and regulate life (Cabanac, 1979; Broom, 1998; Panksepp, 1998). Feelings are an important part of welfare (Duncan 1981, Duncan and Petherick 1991, Dawkins 1980, 1990) but are not all of it. Health is the state of an individual as regards its attempts to cope with pathology so health is an important part of welfare but not all of it (Dawkins, 2004; Broom, 2006b).

1.2 Some Questions about Animal Welfare Law that are Currently Considered

In addition to the issue of what kinds of animals should be protected, a number of other examples of current questions about animal welfare law will now be considered. Section 2 concerns how animal welfare fits into the more general issues of sustainability and product quality. What do the public want and what is the role of law in providing this? Section 3 describes briefly what has been happening in animal welfare law, especially in the European Union (E.U.) and Section 4, how the recent rapid developments in animal welfare concepts and science can be utilized in law. International bodies have an effect on what laws are passed by governments. Two examples considered here are Section 5: whale welfare and Section 6: the World Trade Organisation and the significance for animal welfare of the recently resolved dispute about trade in seal products. Finally some conclusions are presented.

2 Sustainability, Product Quality and Animal Welfare

2.1 Sustainability

The question of whether or not a system is sustainable is important when decisions are made about whether a system for exploiting resources should be used, (Aland and Madec, 2009). The fact that something is profitable and there is a demand for the product is not now sufficient reason for the continuation of production. A system or procedure is sustainable if it is acceptable now and if its expected future effects are acceptable, in particular in relation to resource availability, consequences of functioning and morality of action (Broom, 2001, 2010). A system might not be sustainable for several possible reasons. For animal usage systems, examples of such reasons are: (i) because it involves so much depletion of a resource that this will become unavailable to the system, (ii) because a product of the system accumulates to a degree that prevents the functioning of the system, or (iii) because members of the public find an action involved in it to be unacceptable. Where there is depletion of a resource or accumulation of a product, the level at which this is unacceptable, and hence the point at which the system is unsustainable, is usually considerably lower than that at which the production system itself fails. Other reasons for unacceptability are exemplified below. A system could be unsustainable because of harms to the perpetrator, other people, the environment, or other animals (Table 1).

Table 3.1 - Reasons for lack of sustainability of a system:

- | | |
|-------------------------|---|
| 1. resource depletion | - to level that is unacceptable. |
| | - to level that prevents system function. |
| 2. product accumulation | - to level that people detect and find unacceptable. |
| | - to level that affects other systems in an unacceptable way. |
| | - to level that affects the system itself, perhaps blocking its function. |
| 3. other effect | - to level that is unacceptable. |

The acts or system functioning above could have consequences that are unacceptable because of immediate or later:

- [a] harm to the perpetrator : resource loss or poor welfare
 - [b] harm to other humans : resource loss
 - [c] harm to other humans : poor welfare
 - [d] harm to other animals : poor welfare
 - [e] harm to environment including that of other animals.
-

(modified after Broom, 2010, 2012)

No system or procedure is sustainable if a substantial proportion of the local or world public find aspects of it now unacceptable, or if they consider now that its expected consequences in the future are morally unacceptable. Examples of unsustainable practices are discussed by Broom (2012). Adverse effects on people or animals can be reported in the media around the world and there are now world-wide consequences of unacceptable practices in manufacturing, animal production or other human activities because of increased efficiency of communication.

Media reports of activities or events that the public find unacceptable, may result in consumers in many countries refusing to buy animal and other products from the companies or countries involved, for example dolphins caught in tuna nets, calves kept in small crates and sheep dying on an Australian ship going to Saudi Arabia (Broom, 2002, 2012).

2.2 Product Quality

The idea of quality for the goods that people buy has changed in the last 10-20 years. Quality referred formerly to immediately observable aspects, i.e. for an animal food product, its visual qualities and taste. These aspects of quality are still important, and expectations about taste are tending to become more refined, but other factors are now becoming incorporated into what constitutes good quality. Consumption has consequences and a higher proportion of these are now considered. If a food causes people to become sick, the quality is considered poor. If the food tends to make you fat, the quality is considered poor by some people. If food has added nutrients, some consider the quality to be improved. In addition, a major recent change is that the ethics of the production method are taken into account. Factors considered by purchasers include: (i) the welfare of the animals used in production, (ii) any impact on the environment, including conservation of wildlife, (iii) ensuring a fair payment for producers, especially in poor countries, (iv) the preservation of rural communities so that the people there do not go to live in towns and (v) the carbon footprint of each product as factors leading to global warming are now high on the agenda of many discriminating consumers.

2.3 Consumer Pressure

Consumers drive legislation and retail company codes of practice for animal production (Bennett, 1994; Bennett, et al 2002). Indeed there has been a change from a “push” society, driven by producers, to a “pull” society, driven by consumers (Broom 2010, 2012, 2014 Chapter 11). Legislation on animal welfare has developed in the European Union and in many countries because of pressure from voters (Broom, 2002, 2009). In general, the standards of retail companies have a substantially greater effect on the welfare of farm animals than legislation. The codes of practice of food companies have international impact. For example, many pig producers in Brazil have to comply with the animal welfare standards of United Kingdom supermarkets in

order to sell to them whilst egg producers in Thailand have to rear their birds according to the standards of the increasing numbers of United States food chain companies who have animal welfare standards.

If food is not safe, in that it contains damaging levels of toxins or pathogens, most consumers will never buy it however cheap it is. Individual food production companies are expected to be responsible for this aspect of food quality but the public expects their government to ensure that adequate standards and adequate checking systems exist. The discovery of dioxin-contaminated animal-feed and human food in Belgium (Bernard et al 2002) is an example of this. Governments have fallen and companies have gone bankrupt because of known failure on food safety issues.

Consumers will refrain from purchasing animal products if they judge that the production procedures are unsustainable and thus not of good quality. The quality may be judged to be poor on the basis of negative effects of the production or the product on: human health; human diet; the acceptability of genetic modification; animal welfare; environmental effects such as pollution, conservation and carbon footprint; the efficient use of world food resources; fair trade i.e. considering poor producers; and preserving rural communities. Each of these factors is an aspect of both product quality and the sustainability of the production method (Broom, 2010, 2012).

Poor welfare of animals that are used in the production system is a major reason why some animal production systems are regarded by many of the public as unacceptable. Hence these systems become unsustainable unless there is some modification to them. Animal welfare is becoming more important to members of the public as a reason for demanding change from farmers, food retail companies and governments. Members of the European Parliament receive more letters about animal welfare than about any other subject (Broom, 1999). However, most people think about animal welfare issues infrequently, unless their attention is drawn to it by media coverage. When the information is drawn to public attention, there is a point at which the welfare of the animals becomes so poor that the majority consider the system to be unacceptable. Hence animal welfare and public attitudes toward it must be considered wherever the sustainability of an animal production system is evaluated. Efforts to use systems of animal production that are acceptable in relation to preservation of biodiversity, good animal welfare, minimal carbon footprint and other aspects of sustainability are being developed (Broom, et al 2013). In order to produce laws or codes of practice, scientific evidence is needed.

3 Some Laws in the European Union and the Risk Analysis Approach

What do we need from animal welfare law? Most people would say that the law should prevent people from causing poor welfare in animals: i.e. pain, fear, other suffering, severe disease, distress caused by environments which do not meet the

animals' needs, or distress caused by the genetic selection used in breeding. In reality, the way that a law might do this is principally by acting as a deterrent. People who disobey the law are punished and this becomes known. Whether it is explicit or implicit in a law, there will be a principle which guides the actions of those aware of the law. Laws should provide guidance, not just a mechanism to punish (Radford, 2001). One key point of the U.K. Animal Welfare Law 2006 is that it refers directly to animal welfare. A second is that it refers to people having a duty of care to the animals covered by the law. The effectiveness of laws and codes depends on the attitudes of people to them and on the efficacy of enforcement.

In parallel with the FDA in the United States, in the European Union the European Food Safety Authority (EFSA) has been set up. A difference from the FDA is (i) that many aspects of sustainability are part of the work of EFSA and (ii) that the major part of its work is done by independent scientists, appointed solely on scientific expertise and not as representatives of countries or interest groups. In producing scientific reports, a significant part of their work is the assessment of risks and benefits. The subject area covered by EFSA is wide, reflecting the public concern. One Panel deals with animal disease and animal welfare. The reports that it produces have led to many changes in E.U. legislation and science-based standards in Europe and elsewhere in the world. A scientific committee producing reports on animal welfare is of value in any major country. Measures to check that there is compliance with legislation exist in the Member States of the E.U. and in other countries with regard to food content.

In order that the ethics of the production method can be properly taken into account, products must be traceable. If foods can be traced, it is less likely that toxins, other poor quality materials or pathogens will be in them. If animals can be traced, the sources of animal disease outbreaks are more likely to be discovered and places where injuries, or other causes of poor welfare, occurred are more likely to be found (Broom, 2007). Disease, housing that does not meet animal needs, and management or handling that causes injury or stress to animals are all causes of poor welfare. Legislation and industry initiatives ensuring traceability are important for good animal welfare and efficient production.

Current E.U. legislation deals with the keeping of various farm animal species, the transport of animals, stunning and killing of animals, laboratory procedures and other matters intended to prevent poor welfare in domestic and some wild animals.

The sequence of events that lead to a Directive or Regulation about animal use in the E.U. always includes the production of a scientific report by unbiased scientists. As an example of events leading to an E.U. Directive, the welfare of calves may be considered (Broom, 2009). From 1960 onwards there was some public concern that close confinement in small crates and inadequate diet lead to poor welfare in calves reared for veal production. This was a focus of the book *Animal Machines* by

Harrison (1964) which led to the setting up of a national committee on farm animal welfare in the U.K. In the 1970s and 1980s there were research results giving evidence for serious welfare problems in closely confined calves. In 1988 the recommendation concerning the welfare of cattle from the Council of Europe Standing Committee on the Protection of Animals Kept for Farming Purposes stated that cattle should be able to make all normal movements for grooming, exercise etc. Some European countries passed legislation banning calf-crates. The 1990 report by a group of scientists coordinated by the European Commission was followed in 1991 by Directive 91/629/EEC laying down minimum standards for the protection of calves. This allowed the use of crates of a minimum size but required a report from E.U. Scientific Veterinary Committee by 1/10/97 which Ministers would act on. In the 1990s there was further welfare research on the effects of diet, confinement, space in groups etc on calf welfare and in 1994-1995 much public pressure for action. The scientific report was requested early, hence in 1995 the "Report on the welfare of calves" was produced by the E.U. Scientific Veterinary Committee, Animal Welfare Section. In 1996 there was a proposal for legislation from European Commission staff and the scientific report was considered by Ministry staff from each member state. A revised proposal discussed was by Ministers from each Member state and the 1997 Directive 97/2/EC phasing out the use of veal crates and inadequate diets was passed.

Similarly, within the E.U., the Council Regulation (EC) 1/2005 "On the protection of animals during transport and related operations" takes up some of the recommendations of two separate reports: (i) the E.U. Scientific Committee on Animal Health and Animal Welfare Report "The welfare of animals during transport (Details for Horses, Pigs, Sheep and Cattle)" (March 2002) and (ii) the European Food Safety Authority "Report on the welfare of animals during transport" (2004) which deals with the other species. There are now many other examples of legislation based on information from scientific reports in the E.U. and elsewhere.

The risks that a toxic substance will be in a foodstuff, or that a pathogen will enter an animal and proliferate in it, or that a management procedure will result in poor welfare in a farm animal have always been considered in scientific reports like those produced by the European Food Safety Authority (EFSA) or its predecessors in the E.U. However, in recent years the methodology for assessing risk has become more sophisticated and systematic so it is now used in many reports on topics like those exemplified above. This has resulted in scientists being more rigorous in their analyses of potential problems. If a quantitative or qualitative risk analysis is carried out, it is less likely that factors that affect the harm under consideration will be missed. Also, the relative importance of the factors involved will often be estimated more accurately. This approach was stimulated by the initial failures in the late 1980s and early 1990s to properly evaluate the risks associated with the outbreak of bovine spongiform encephalopathy (BSE) in cattle and Creutzfeldt-Jacob Disease in humans who had consumed some cattle products. A reluctance, on the part of Ministry staff and politicians, to harm the cattle and cattle-feed industries led to inadequate analysis

of risks to cattle and humans. The result of the government policies might have been the deaths of millions of people, although fortunately the number will be very much lower than this, and actually caused much more harm to the industries than there would have been if a proper risk analysis had been conducted at an early stage.

The sequence of procedures during the analysis of risks or benefits is: first to list factors (hazards if negative), second to calculate exposure, third to estimate uncertainty. The analysis may be quantitative, if sufficient numerical information is available, or qualitative if it is not. The inclusion of risk analysis in scientific reports and opinions produced by EFSA and other organisations has helped decision makers to take appropriate action, for example to minimise animal disease and improve animal welfare (Berthe et al 2012). It is desirable that this approach should be continued, with suitable modification according to the limitations associated with the relevant data.

Some factors that affect animals have beneficial effects rather than leading to a greater risk of a harm. This is most obvious when the wide-ranging components of animal welfare are considered. Food, access to other resources, human contact, social interactions and many other factors can result in benefit to the individual. Any one of these factors may also stimulate the immune system of an animal and hence confer benefit by reducing the likelihood of clinical disease. Hence every scientific review of welfare in general or of a component of health, such as the occurrence and effects of a pathological condition, should consider the possible beneficial effects of factors as well as their impact on risk. It is never sufficient in such reports to merely conduct a risk analysis. Those who formulate laws, such as government ministers or the staff of the European Commission, have to take account of all factors in determining the best course of action so they are never just risk managers. Much of what they are trying to achieve is benefit, not just reduction of risk (Broom 2009, 2014, Rault 2012, Fraser et al 2013). This is true in legislation to reduce disease and to promote good health as well as, more obviously, in the animal welfare area. Legislation can promote good welfare and it often does.

4 Developments in Animal Welfare Science and How These can be Utilised in Law

Animal welfare scientists provide objective information about the welfare of animals. Most welfare indicators will help to pinpoint the state of the animal wherever it is on the scale from very good to very poor. Some measures are most relevant to short-term problems, such as those associated with human handling or a brief period of adverse physical conditions, whereas others are more appropriate to long-term problems. Tests of avoidance and positive preference help in the design of better conditions and procedures. In all welfare assessment it is necessary to take account of individual variation in attempts to cope with adversity and in the effects which adversity has on

the animal. The general methods for assessing welfare are summarised by Broom and Fraser (2015).

The central role of animal welfare scientists is to further develop their discipline and to carry out studies in which they evaluate the welfare of animals housed or treated in different ways. The collection and analysis of data by animal welfare scientists should be carried out in an objective way that is independent of any ethical view about the outcome of the research. After the results have been obtained, scientists, like any member of the public, may make judgements about what should be done.

When scientific reports on animal welfare matters are produced, these are easier for legislators and other informed persons to use and have greater effect if the primary scientific literature is quoted giving full references. However, evaluation of the quality of the scientific information is also important. The conclusions from the data reviewed should be quoted and recommendations made based on the evidence available. Where there is little scientific information conclusions and recommendations should still be made but should make this clear. In some cases, it is valid to use information from related species but in other cases it is not. For example, every social animal will be adversely affected by being tied up and prevented from showing social as well as normal maintenance behaviour so a report on a social animal that has not been studied directly in this respect could refer to studies of other species. On the other hand, a pathogen that causes infection in one species may not cause infection in another so extrapolation from species to species is not always reliable.

Some of the causes of animal welfare problems in animals kept for human use are a result of genetic selection whilst others are a consequence of housing conditions, management methods or procedures used. In order to legislate about such matters, particular practices or systems might be prohibited. However, sometimes bad management in a good system has similar effects on welfare to good management in a less good system and even the best housing and management may result in poor welfare if the genetic selection is causing the problems. Hence the best way of designing laws may be to require that very negative consequences for animals do not occur, or to ensure that specified good welfare does occur.

Measures that predict or assess welfare that might be used in laws or codes of practice may be: resource-based, management-based or welfare-outcome indicators that are animal-based. As an example of the latter, because lameness in broiler chickens and dairy cows is a problem, it is possible to monitor the number of animals that are lame as a welfare-outcome indicator. This involves using an animal-based measure. The welfare-outcome scored is the animal's ability to walk and this is done using a scientifically designed scale of walking ability. Animals on farm or arriving at a slaughterhouse can be checked and a threshold level of lameness can be used to decide whether or not their welfare complies with the law or code of practice. For

dairy cows, the EFSA report and opinions on the welfare of dairy cows proposed that the threshold for a group of dairy cows on farm or at the slaughterhouse might be 10%. In order to facilitate this approach, EFSA have produced a series of reports/opinions on animal-based welfare-outcome indicators for several farm species.

The links between factors that might affect welfare and consequences, perhaps used as measures, need to be validated (see EFSA, 2012). Some are very clear, for example a bitten pig's tail is easily recognisable, or they are clearly negative, for example frequent stereotypies indicate substantial problems. However others are less clear, for example various factors may affect heterophil/lymphocyte ratio and many causes of poor welfare do not increase cortisol.

Current plans for legal action on animal welfare in the E.U. involve further provision of information about the scientific assessment of animal welfare, including animal-based welfare-outcome indicators, a centre for making such information available and general legislation to direct its use. This should be enacted in 2015 and further specific legislation will follow.

5 Whale Welfare

Public concern about whales was initially focused on conservation and the main business of the International Whaling Commission (I.W.C.) has been population management and conservation. However, for the general public in many countries, the welfare of the hunted animals has become more and more important. Despite this well-documented change in public attitude around the world, the I.W.C. had never included the term welfare on any of its agendas up to 2012. It seems that this occurred because of vetos by the whaling nations. This international body includes a very large number of countries that do not permit whaling but which have relatively little influence on the very small number that do permit it. In 2012, fringe meetings and sub-group meetings of the I.W.C. considered the welfare of hunted whales. Factual information was presented by the author and others. The whale welfare issues are not just about whaling but also about whales in captivity, whale-watching and other impacts of humans on whales. The whale populations in most countries are considered to be much more valuable as a source of revenue from tourists who wish to be taken whale-watching than from killing whales. However, such activities have to be carefully regulated to ensure good welfare in the whales and continued breeding with consequent conservation of the species.

Whale welfare can be assessed using many of the measures that are used for other animals (Broom, 2013). Whales are sentient, good at learning and have a pain system. In relation to the whale hunt, studies of welfare should consider the effects of: the disturbance resulting from the approach of humans in boats, chasing by boats, a harpoon entering tissue, pulling on the line attached to the harpoon, tissue damage by

an explosive harpoon and procedures during capture of individuals after they have been pulled to the whaling ship. After these matters had been discussed in the informal meetings, animal welfare was placed on the agenda of the I.W.C.

One of the terms used in relation to whaling, and other killing methods, such as that of wild seals and animals in abattoirs, is humane killing. The term humane in relation to animals means their treatment in such a way that their welfare is good to a certain high degree. The welfare is either above the threshold, in which case the treatment is humane, or it is not. No killing procedure can be partly humane. Humane killing implies either that the treatment of the animals in the course of the killing procedure does not cause poor welfare, or that the procedure itself results in insensibility to pain and distress within a few seconds (Broom, 1999a,b, 2013). With present methodologies for catching whales during whaling, the extent of poor welfare during catching and killing always appears to be substantial. Indeed, the magnitude of poor welfare is much greater than that of any legally permitted method of killing a domestic or wild animal. The whale killing procedure during whaling would be humane for very few whales. Hence whaling for profit cannot be morally justified.

6 The World Trade Organisation: Significance for Animal Welfare of the Dispute about Trade in Seal Products

The rules of the World Trade Organization (W.T.O.) do not specify that animal welfare is an accepted ground for restricting trade although they do specify public morality as such a ground. This situation has resulted in difficulties for countries with strict animal welfare laws as they cannot prevent imports of animal products from countries that can produce them more cheaply because they do not have strict animal welfare laws.

The European Union passed legislation banning trade in seal products on animal welfare grounds. This was the result of public pressure over many years because many of the young seals killed for their fur, principally in Canada, were not killed in a humane way (Broom 2014). The E.U. produced hardly any sealskin products so this action was not to do with competition with Canada. The E.U. ban was challenged at the World Trade Organisation by Canada and this challenge was supported by Norway. A W.T.O. Panel was constituted (DISPUTE DS400 European Communities — Measures Prohibiting the Importation and Marketing of Seal Products) and hearings occurred in Geneva during 2013. At these hearings, Namibia and Iceland spoke in support of Canada. Other countries including Russia, which has a ban similar to that of the E.U. on animal welfare grounds, and the United States, which has a ban on conservation grounds, spoke in favour of the E.U. position.

Scientific evidence presented at the W.T.O. hearings by the author, based on several published papers and accepted by the W.T.O. Panel is summarised here.

Seals are sentient beings. They can learn complex tasks, they are social and respond differentially to individuals in their groups, they are aware of the world in relation to themselves and of feelings such as pain and fear.

There is no evidence that the pain system in seals is different from other mammals. They have: pain receptors, pain pathways and neurotransmitters, pain analysis centres, pain inhibitors such as endogenous opioids, physiological responses to pain and behavioural responses to pain. In humans and other species, extreme fear is regarded as worse than most pain. Behavioural changes during pain and fear in seals include: escape attempts (often towards water), vocalisations, freezing, rearing up in a defensive posture, opening the mouth and violent body movements.

The majority of seals that are killed in the Canadian commercial seal hunt are harp seals. 98% of them are pups between 12 days and 3 months of age. Harp seals are called whitecoats up to 12 days of age while hooded seal pups up to 13 months old are called bluebacks. Since 1987 in Canada only weaned pups: 12-19 day-old “ragged jackets” and 19=30 day-old “beaters”, are hunted. They have lost some or all of their initial fur.

Climate change has caused a great reduction in sea ice cover in the southern Gulf of St. Lawrence in recent years. Hence most seal hunting now occurs outside the mouth of the Gulf. In some years, the bulk of the killing occurs within one week.

Seals are either killed by a sealer walking to the seal and clubbing it or by a person on a moving boat shooting a seal on an ice floe, that is often moving, or shooting a seal in the water. Clubbing and shooting can wound the seal or make the animal temporarily unconscious. Injured seals often enter the water and may escape the sealers. These injured seals may recover or die of their wounds some hours, days or weeks later. Herding or chasing seals will cause fear and other forms of poor welfare.

The major question is whether or not there is there a humane, acceptable method of killing seals. All of the arguments here are about welfare and not about whether or not it is acceptable to kill seals. According to generally accepted principles, for example E.U. legislation and American Veterinary Medical Association guidelines (commercial slaughter, disease control, veterinarian), humane killing implies that: (i) the treatment of the animals in the course of the killing procedure does not cause poor welfare and (ii) the stunning procedure itself results in instantaneous insensibility or, if the agent causing insensibility or death is a gas or injectable substance that is not detectable by the animal, no poor welfare occurs before insensibility and then death.

For a seal kill to be humane, whether in commercial conditions or not, the following steps must occur:

1. The animal should be stunned without causing unnecessary pain, fear or distress.

2. On almost all occasions, there should be no need to repeat application of the stunning method.
3. The animal should be immediately monitored to confirm unconsciousness.
4. A killing method (such as bleeding) should be carried out without delay so that recovery of consciousness does not occur before death.

Seals can be killed humanely, for example by a veterinarian in conditions like those in a laboratory or zoo. For seals on ice floes that have been clubbed or shot, some will be conscious, some will be unconscious and some will be dead but identification of unconsciousness and death is difficult. The main methods used by sealers are unreliable. A seal with the top of its cranium (calvarium) partly caved-in may be conscious. A seal with no cranial damage may be unconscious or dead. Without bleeding by cutting a major blood vessel, death cannot be certain. Bleeding a conscious animal causes extreme pain and skinning a conscious animal will cause extreme pain for much longer so a high magnitude of poor welfare. There is often failure of the stunning and killing method and it is not humane if the animal is not rendered instantaneously unconscious, monitored without delay, and bled before recovery of consciousness.

During a commercial seal hunt, some seals will be killed humanely. However, even if all rules are obeyed, the welfare of a substantial proportion of seals will be very poor. It is not possible to stun and kill seals in commercial conditions without the welfare of many seals being poor.

A key question is how seal killing on ice floes compares with abattoir killing. Hence it is relevant to compare the rates of miss-stuns and delays in commercial sealing and abattoirs. In a series of papers on the Canadian seal hunt, the frequency of inaccurate stun, involving the need to repeat the stunning method, ranged from 11-92%. The sealers knew that they were being watched so the figures may be underestimates of the actual frequency in normal sealing conditions. In studies in abattoirs, the figures for several species were 0%, 1.9%, 1.6% and 9.2%. However, in every case in the abattoir, a repeat stun occurred within 3 seconds. As with the seal hunts, these figures were sometimes obtained when the abattoir staff knew that they were being watched so less efficient stunning might sometimes occur. However, the stunning procedure is much easier in an abattoir than on the ice and repeat stunning is quick and easy if legal requirements, e.g. for back-up stunner provision, are observed. Sealers often could not get to the animals quickly so the delay was a mean of 8.6 to 27 seconds and often much longer. In the Canadian seal hunt the delay between stunning and monitoring was 16-307 seconds, with delay to bleeding a little longer, and some were still conscious but this was not detected. In abattoirs, the check is within a few seconds and bleeding is within 20 seconds. The Canadian government figures for seals struck and lost are a mean of 5%. These seals are injured and may take many hours or days to die. This does not occur in abattoirs.

Although it is possible to kill seals humanely in controlled conditions on land, commercial seal killing causes much worse welfare than any legal abattoir killing. It is not possible to improve seal killing so that most animals are humanely killed.

The W.T.O. panel found on 25 November 2013 that the E.U. Seal Regime does not violate Article 2.2 of the Technical Barriers to Trade (TBT) Agreement because it fulfils the objective of addressing E.U. public moral concerns on seal welfare to a certain extent, and no alternative measure was demonstrated to make an equivalent or greater contribution to the fulfilment of the objective. The E.U. ban on seal products was found not to violate the general Agreement on Tariffs and Trade (GATT). However, the E.U.'s exception to the seal product ban for indigenous peoples and marine resource management was found to be unacceptable by the W.T.O. This means that seal products resulting from inhumane killing methods may not be traded in the E.U. in any circumstances.

This is a very important result as it is the first time that a product ban on animal welfare grounds, as part of public morality, has been accepted by the W.T.O. The possibility is raised that other product bans on the same grounds might be accepted. At present, certain farming practices are banned in some countries because their effects on animal welfare are unacceptable to the public in those countries. Examples include the E.U. bans on keeping calves in small crates, keeping pregnant sows tethered or confined in stalls that do not allow the sow to turn around, and keeping laying hens in battery cages with a space allowance of less than 550 cm² per bird. However, these systems are allowed in many other countries and it has been perceived that the import of veal, pig meat and eggs from such countries could not be blocked by the E.U. because of W.T.O. rules. Following the W.T.O. ruling in the seal products case, it may be that this situation will change because the public in the E.U. consider that the very poor welfare of closely confined calves, sows and hens is unacceptable and a matter of public morality.

7 Conclusions

1. In relation to animal usage throughout the world, there will be increasing demand from consumers for the avoidance of adverse effects on human welfare, animal welfare and the environment.
2. A system or procedure is sustainable if it is acceptable now and if its expected future effects are acceptable, in particular in relation to resource availability, consequences of functioning and morality of action.
3. Animal welfare is one of the factors determining sustainability and is a part of product quality.
4. Animal welfare has been developing rapidly as a scientific discipline.
5. Laws should emphasise duty of care, be based on scientific evidence, and some should use welfare-outcome measures (animal-based).

6. International bodies, such as the I.W.C. and W.T.O., take notice of scientific studies of animal welfare. Whale welfare is now on the I.W.C. agenda and, with presently available killing methods, whaling for profit cannot be morally justified. The upholding by the W.T.O. of the E.U. seal product ban on animal welfare grounds as part of public morality may lead to other product bans on the same grounds.

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