Understanding Animal Welfare

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Abstract

In this chapter, we introduce some of the principal issues that have arisen in relation to scientific approaches to animal welfare, most of which are treated in more detail later in the book. Much of the apparent disagreement between people about animal welfare stems from mixing up scientific questions about the actual welfare of animals and ethical questions about how we ought to treat and care for animals. This chapter does not deal with these ethical questions but focuses on the science of animal welfare and on the different approaches taken in the past to understand what animal welfare is and how to assess it. We nevertheless put animal welfare in its social context by presenting a brief history and referring to some key events that have shaped the development of animal welfare science. We discuss the links between animal welfare and animal health, and the links between animal welfare and natural behaviour. Although these links seem self-evident, and the assessment of welfare based on these approaches often leads to the same conclusions, there are many considerations that are not usually taken into account. Examples include how difficult it is to define good health, or to compare the degree of suffering experienced by animals with different types of disease, illness and injury. Furthermore, even if behaviour has evolved because it contributes to the survival of animals under natural conditions, not all natural behaviour is desirable. Ultimately, we argue that as concern about the welfare of animals stems from the fact that they are sentient (capable of feelings), then feelings have to be a major part, perhaps the central part, of their welfare.

2.1 Introduction

Most people have quite strong views on how animals ought to be treated, but many appear not to appreciate the complexity of the issue. Admittedly, the area of animal welfare and animal protection is a complex one, but in reality it is no more (or less) difficult to understand than many other areas where science and society meet, even though the debate may be more emotionally loaded than usual. The term ‘animal welfare’ is used widely, and often loosely, in the media and by society in general, often in the context of discussion on politics, economics, trade, food production and generally what society ‘ought’ to do to protect animals. However, this chapter will focus on understanding the science of animal welfare and so we use the term ‘animal welfare’ in the context of animal welfare science.

In scientific use, the term ‘animal welfare’ refers to the actual state of an animal rather than to the ethical obligations that people have to care for animals. Thus, we consider ‘welfare as a characteristic of an animal, not something that is given to it’ (Broom, 1996) and that the ‘term animal welfare describes the quality of an animal’s life as it is experienced by an individual animal’ (Bracke et al., 1999). Therefore, an animal in the wild suffering from disease or malnutrition can be said to have poor welfare even if people were not responsible for this and have no ethical obligations to care for that animal.

The scientific concept of animal welfare is still developing. It arose out of attempts by scientists to deal with the ethical concerns about the way that we treat animals. Thus, to understand the concept of animal welfare, we need to understand the concerns that people have about animals. David Fraser and his colleagues (Fraser et al., 1997; Fraser, 2008) have examined the most common statements made about farm animal welfare in an effort to clarify the most important concerns that people have. Three broad types of questions are typically raised about the effects of modern farming systems upon animal welfare: (i) Is the animal happy or is it suffering from pain or other undesirable emotions? (i.e. concerns about the animal’s feelings or emotions); (ii) Is the animal healthy and producing well? (i.e. concerns about

the animal’s ability to function biologically); and (iii) is the animal able to perform its normal behaviour and live a reasonably natural life? (i.e. concerns about the naturalness of how the animal lives). These three aspects of animal welfare are usually included in official definitions. For example, the World Organisation for Animal Health (OIE) defines an animal as having good welfare if it is: ‘healthy, comfortable, well nourished, safe, able to express innate behaviour, and ... is not suffering from unpleasant states such as pain, fear, and distress’ (OIE, 2010). These aspects are important not only for farm animals, but also encompass most of the concerns about the welfare of zoo, laboratory and companion animals; they are examined in more detail in Sections 2.3, 2.4 and 2.5.

In reading the various discussions of animal welfare, one is often left with the impression that there is little agreement as to its best definition (Keeling, 2004). Much of the disagreement between people about the welfare of animals arises from the fact that different stakeholders tend to put emphasis on different aspects of animal welfare. For example, veterinarians and farmers generally focus on disease, injury, poor growth rates and reproductive problems. Medical researchers using animals concentrate on hygienic conditions and freedom from disease. In contrast, many members of the public focus upon whether the animals are suffering from unpleasant feelings, such as pain, fear or hunger. For people interested in animal welfare, especially consumers of organic products, a key concern is whether the animal is able to live a relatively natural life and express its natural behaviour. Some wrongly link a happy and healthy animal with a tasty and nutritious animal product. These different points of view often give the impression that there is no generally accepted definition of animal welfare (Fig. 2.1).

The recognition that animal welfare is multifaceted, with links to animal health, animal feelings and behaviour, has led to definitions of animal welfare that basically list the conditions under which animal welfare is good or bad. The best known example of such a definition is provided by

Fig. 2.1. Mistaking a part for the whole. Most readers are probably familiar with the parable of the blind men and the elephant. One, feeling only the leg, states that the elephant is like a tree; another feeling only the tail, believes it more like a piece of rope. This is the classic case of people mistaking a part of something for the whole. We suggest that much of the debate about animal welfare is equivalent, with different groups of people focusing on different aspects, and being unable to appreciate fully the multifaceted nature of animal welfare. Image from Miscellaneous Items in High Demand Collection, Prints & Photographs Division, Library of Congress LC-USZ62-134248.
The Five Freedoms, which define good welfare as freedom: (i) from hunger and thirst; (ii) from discomfort; (iii) from pain, injury or disease; (iv) from fear and distress; and (v) to express normal behaviour (FAWC, 2009). While such definitions have the advantage of being inclusive, they often lead to trade-offs between the different threats and opportunities to good animal welfare. For example, ample research has now shown that the traditional battery cage for laying hens frustrates the hen's motivation to perform nest-building behaviour, thus breaching the 'freedom' to perform normal behaviour. Some alternative systems that do allow this behaviour, though, such as non-cage or free-range systems, tend to be associated with poorer health and increased injurious behaviour, such as feather pecking and cannibalism, thus breaching the freedom from pain, injury and disease (Blokhuis et al., 2007). Without a concept of animal welfare that provides a 'common currency' it is very difficult to assess when and where a hen's overall welfare is best safeguarded. The absence of a scientific concept that allows us to balance the different threats to animal welfare is one of the most important weaknesses in animal welfare science at present.

However, we must not overestimate the differences between the different interested parties in what they consider to be good animal welfare. In practice, when having to make real-life decisions about whether or not animal welfare is good or bad, people are capable of coming to some consensus. For example, Whay et al. (2003) found considerable agreement between 'experts' (veterinarians and behavioural scientists) as to which of two dairy farms had the higher level of welfare when they were presented with a variety of information about the state of the cows on the two farms. There are also many other examples that show how consensus can be achieved on what constitutes good or poor welfare by using expert consultation methods (Anonymous, 2001; Hegelund and Sorensen, 2007; Leach et al., 2008). The results show that with appropriate techniques, experts are capable of integrating a variety of information about the animals and their housing and management on any given farm to achieve a fair consensus on the level of welfare on that farm. Such techniques have heuristic value in making decisions about animal welfare, even in the absence of a clear definition of welfare. Of course there is always the possibility that all the 'experts' could be wrong, but this most often occurs when there is a lack of information rather than a difference of opinion about the meaning of animal welfare.

### 2.2 A Brief History of Animal Welfare

Concern about the welfare of animals is nothing new – pet owners, zoo managers, farmers and veterinarians have always been concerned about the condition of animals in their care and have tried to ensure that they are healthy and well nourished. There is little doubt that good health is an essential component of good welfare. However, the field of research that has become known as ‘animal welfare science’ stems largely from the public’s concern about some modern farming techniques, especially the use of intensive husbandry (Fig. 2.2), the increased use of animals in medical research involving painful experiments and housing conditions that are designed more for the convenience of the human beings using or caring for the animals than for the animals themselves.

An important event that started this recent interest in farm animal welfare was the publication of Animal Machines by Ruth Harrison (1964) (Fig. 2.3). This book described many of the changes that had happened in agriculture over the previous decades; changes that were seen as 'unnatural' and contrary to what the public often assumed to be the norm for farming. It introduced the term ‘factory farm’ and focused on intensive farming practices, in particular the use of battery cages for laying hens, gestation crates for pigs and methods of raising veal calves (Fig. 2.4). These particular farming practices have tended to dominate both research and animal welfare legislation. Somewhat later, philosophers, such as Peter Singer (1975) and Tom Regan (1983), questioned this exploitation of animals for our own purposes. The issues they raised, especially the degree of suffering caused to animals by farming and research practices, and the apparently ‘unnatural’ conditions under which animals are kept, have shaped the legislative and other approaches that various countries have adopted in dealing with the issue of animal welfare.

In response to the writings of Ruth Harrison, the Brambell Committee was established by the UK government to ‘Enquire into the welfare of animals kept under intensive husbandry systems’. The Brambell Report to the UK government was one of the most influential writings on animal welfare.
Fig. 2.2. The apparent 'unnaturalness' of many modern farms is one factor that has provoked disquiet in the general public about the welfare of farm animals. For example, many people who are uninformed about the modern dairying industry assume that cows are kept outdoors, grazing on grass and in contact with their calves. In reality, in most industrialized countries, dairy cows are separated from their calves soon after birth, housed indoors often with no access to pasture, and eat a diet of grain rather than grass. There are welfare problems associated with such intensive housing systems, but there are also welfare problems associated with outdoor housing. The apparent 'naturalness' of a method of housing animals gives little information about its effect on the welfare of the animals. The European Convention for the Protection of Animals Kept for Farming Purposes of 1978 focused upon the importance of avoiding suffering and ensuring that housing, nutrition and management systems should be appropriate to animals' physiological and ethological needs in accordance with ... scientific knowledge' (Council of Europe, 1978, p. 15). These last requirements, especially the reference to 'ethological needs', precipitated considerable scientific research aimed at better understanding such needs and how these differ among species. However, the importance given to concepts associated with natural behaviour in legislation or official definitions of welfare can cause problems for science. For example, the OIE's definition of animal welfare (OIE, 2010) refers to 'innate behaviour' but there is no clear scientific definition of innateness (Mameli and Bateson, 2006). This topic is discussed in more detail in Section 2.5.

Surveys undertaken in the EU show that consumers often state that animal welfare issues are important to them in making purchasing decisions (e.g. European Commission, 2007). Animal welfare is an accepted part of product quality in many countries (Blokhuis et al., 2008) and this has led to a proliferation of 'quality assurance' schemes that try to assure consumers that the products they buy are produced according to practices that respect animal welfare.
A concerned member of the public. Ruth Harrison (the author of Animal Machines, 1964) played a central role in the development of animal welfare science, not because she was a scientist, but because she was able to crystallize the growing public concern about the effects of modern farming systems on the welfare of the animals. The fact that research into animal welfare in large part involves responding to public concerns means that we cannot define animal welfare in a purely scientific fashion without referring to the ethical concerns that the public has about how we treat animals. A good biography of Ruth Harrison can be found in an article by van de Weerd and Sandilands (2008). Image from the library of Ruth Harrison.

One of the earliest successful independent schemes is the Freedom Foods scheme of the RSPCA (Royal Society for the Prevention of Cruelty to Animals) in the UK. Quality assurance schemes have also become the most common way of dealing with farm animal welfare issues in North America (Mench, 2008), even though there is little control of how the claims being made actually relate to animal welfare. Because consumers are the drivers in this development, companies are attempting to satisfy the public perception of welfare, at least in Europe, by moving animals to large areas outdoors. This is happening even though there is no guarantee of good welfare by keeping animals outdoors. Increasingly, research is directed towards validating measures of animal welfare that can reliably and feasibly be used on farm, during transport and at slaughter, in order to verify such claims about animal welfare.

Fig. 2.3. A 'concerned member of the public'.

Fig. 2.4. A 'crate' for veal calves (top), a stall for pregnant pigs (centre) and a battery cage for laying hens (bottom). These intensive forms of housing systems have been the subject of most attention in terms of the effect on the welfare of farm animals.
More recently, the globalization of food has led to increasing awareness that animal welfare issues are not restricted to modern intensive systems, but occur also in traditional farming systems that have changed little over decades, if not hundreds of years. Some recent initiatives by the Food and Agriculture Organization of the United Nations (FAO, 2009) are specifically targeted at increasing awareness about animal welfare in developing countries as a way of reducing poverty.

Animal welfare science grew initially out of concern about how animals were being treated and this is still the case 50 years later. Assessment of animal welfare in practice as part of enforcing legislation or in checking compliance with assurance schemes will be addressed in more detail in later chapters, as will economic aspects of animal welfare. For this reason, we now turn in this chapter to discussing animal welfare science from the animal’s perspective.

### 2.3 Welfare and the Subjective Experience of Animals

As we have stated previously, the ethical concern that human beings have for animals is a result of the capacity of animals for subjective experience and especially of their capacity to suffer from pain or other aversive mental states, such as fear or boredom. Consequently, developing scientific methods to deal with the feelings or emotions of animals have played a major role in animal welfare science. When Ruth Harrison (1964, p. 3) criticized intensive livestock husbandry practices in *Animal Machines*, she was concerned about the feelings of the animals:

> Today the exploitation has been taken to a degree which involves not only the elimination of all enjoyment, the frustration of almost all natural instincts, but its replacement with acute discomfort, boredom and the actual denial of health. It has been taken to a degree where the animal is not allowed to live before it dies.

A year later, the Brambell Committee (1965) also acknowledged that feelings were an important feature of welfare. In our view they were very far sighted in claiming that:

Welfare is a wide term that embraces both the physical and mental well-being of the animal. Any attempt to evaluate welfare, therefore, must take into account the scientific evidence available concerning the feelings of animals that can be derived from their structure and functions and also from their behaviour.

Interest in the subjective or emotional experiences of animals and their importance for animal welfare has a long history (Preece, 2007). In 1839, William Youatt, an English veterinarian who took a humanitarian approach to animal welfare, criticized many practices that he observed in 19th century England. The list will be uncannily familiar to 21st century readers: too early training of racehorses; steeple chasing; transport methods for newly born calves; the raising of veal calves; tail docking and ear cropping of dogs; using live bait for fishing; the dissection of living animals. In making these criticisms, Youatt always relied on scientific evidence. For example, when talking about slaughterhouse management, he strongly recommends the poleaxe for stunning animals before bleeding them to death, rather than cervical (neck) dislocation. He explains very clearly that, although the area below the cervical dislocation will be insensitive, there is probably some sensation in the area above it and this could lead to a reduction of welfare. In Youatt’s words (1839, p 179), ‘When we use the poll-axe, we come upon the very seat of sensation – we crush all feeling’. Some 50 years later, George John Romanes (1884), a prominent biologist and follower of Darwin, wrote that:

> Pleasures and Pains must have been evolved as the subjective accompaniment of processes which are respectively beneficial or injurious to the organism, and so evolved for the purpose or to the end that the organism should seek the one and shun the other.

The more recent prominence given to the feelings or emotional states of animals and how these affect their welfare came particularly from the writings of Marian Dawkins and Ian Duncan (e.g. Duncan and Dawkins, 1983), who suggested that feelings play a major role in welfare. In fact, Duncan went further in suggesting that not only were feelings an important component of welfare, but that they might be the only thing that mattered (Duncan, 1996). For example, consider the case of an animal that is not able to eat enough to meet its biological requirements. While the deficiency of nutrients may be the primary factor that reduces the biological functioning of the animal, it is the subjective experience of this state by the animal, i.e. the feeling of hunger, that reduces the animal’s welfare. Similarly, it is possible to separate the primary state of being ill, which reduces health, from the secondary subjective experience of feeling ill, which reduces welfare.
One advantage of seeing animal welfare as threatened only when the animal is suffering is that this does provide a common currency for ranking different threats to animal welfare. Thus, the question of whether a laying hen’s welfare is reduced more by frustration at not being able to build a nest or by being attacked by other hens can be answered (in theory) by finding which causes more suffering. But is it sufficient to ensure that animals are not suffering as a result of how we treat them, or should we aim to provide them with opportunities to experience pleasure? Some have argued that it is the degree of pleasure that an animal obtains from performing a behaviour or obtaining a valued resource, rather than the amount of suffering caused by the inability to perform the behaviour or the absence of the resource, that determines its welfare, and that this should be considered the common currency (Cabanac, 1992; Spruijt et al., 2001).

A commonly heard criticism of the emphasis placed on animals’ sentences or emotions is that these are beyond the reach of science. A real breakthrough in the acceptance of feelings in scientific investigations came with the publication of Donald Griffin’s book *The Question of Animal Awareness* (Griffin, 1975). Applied ethologists who had been struggling to answer questions raised by Ruth Harrison (1964) and the Brambell Committee (1965), now began to recognize that the feelings and emotions of animals are accessible to scientific investigation. Many recent publications show that an understanding of the subjective feelings of animals is now widely accepted to be amenable to scientific investigation (Duncan 2006; Brydges and Braithwaite, 2008; Dawkins, 2008; Mendl et al., 2009; Reeffmann et al. 2009). In particular, considerable progress has been made on understanding and measuring animal pain, and a large and rapidly developing scientific literature on pain assessment and prevention is now available for farm animals (for a review see Weary et al., 2006). More recent research is beginning to examine pain in a much wider range of species, such as invertebrates (Elwood et al., 2009). There has also been interest in finding signs that may indicate that the welfare of an animal is good rather than signs that its welfare is bad, and in investigating positive emotions (Boissy et al., 2007).

2.4 Health, Production and Reproduction

It seems self-evident that good animal welfare requires that the animals be healthy, and that the occurrence of disease and injury will lead to poor welfare. Failure to treat disease adequately is widely condemned as breaching the basic tenets of animal care. For companion animals, most illnesses are treated fairly quickly, and the main ethical issue involves the question of the relative benefits of treating chronic illness, or in using treatments that are themselves painful, as opposed to immediate euthanasia. The relationship between animal welfare and animal health has been of most concern in relation to farm animals, where the cost of treating commonly occurring health problems in large numbers of animals can be prohibitive. Farm animals, both in traditional and modern housing systems, and under both intensive and extensive management, suffer from a variety of health problems, and the incidence of these problems can be surprisingly high. For example, on average, 25% of dairy cows in the USA suffer from lameness (Espejo et al., 2006) and 75% of broiler chickens in Portugal suffer from foot-pad dermatitis (Gouveia et al., 2009).

The importance of good health for good welfare is one of the least controversial aspects of the debate about animal welfare. Farmers readily appreciate the economic cost of disease and scientists have also long accepted the importance of good health for good animal welfare. The importance of disease was recognized as an essential part of good welfare by the Brambell Committee (1965), who wrote that:

[A] principal cause of suffering in animals, as it is in men, is disease ... we lay stress on the incidence of disease and on the guarantee that a sick animal will be quickly recognized and appropriately treated or slaughtered. Any given intensive system of husbandry may, or may not, be satisfactory in one or both of these respects. Some compare favourably with traditional methods with regard to disease, others compare unfavourably.

However, we should not assume that concern about disease typifies the welfare concerns only of veterinarians and farmers. Graphic descriptions of illness in modern intensive housing systems figured prominently among attempts to turn the public against ‘factory farms’. For example, Singer (1975, pp. 104–105), in describing modern methods of housing broilers writes that:

[Their] fast growth rate also causes crippling and deformities that force producers to kill an additional 1 to 2 percent of broiler chickens – and since only severe cases are culled, the number of birds suffering from deformities is bound to be higher ... When the
birds must stand and sit on rotting, dirty ammonia-charged litter, they also suffer from ulcerated feet, breast blisters, and hock burns.

Measures of the occurrence of disease and injury have long been used as indicators of animal welfare and have figured prominently in assessments of farm animal welfare in many species. The main difficulty in using health measures to assess animal welfare lies though in judging the degree of suffering associated with different forms of illness or injury. As Dawkins (1998, p. 73) explains, a key question when dealing with symptoms of illness as a sign of poor welfare is:

Are animals that can be shown to have these objectively measured symptoms consciously experiencing what humans would call suffering, if we were experiencing these same symptoms?

Wells et al. (1998, p. 3034) further point out that:

[Concern about animal welfare] seems to be directed toward diseases leading to perceived suffering by animals ... Clinical lameness has been recognized as an animal welfare concern because of the sometimes obvious signs of pain in the affected cattle.

Although most attention has been paid to clinical diseases where the symptoms of illness are obvious, scientists have recently been interested in trying to assess animal welfare by examining subclinical physiological changes that may show that animals are under 'stress' or are at risk of becoming ill (Moberg, 2000). Moberg argues that an animal's responses to any challenge or stressor require utilization of the animal's biological resources (e.g. time or energy or nutrients) that would usually be used to support normal biological functioning, and that the severity of any stress can be measured in terms of the biological cost of the response. When the stress is sufficiently severe or prolonged (Moberg, 2000, p. 13):

[This] results in distress when the stress response shifts sufficient resources to impair other biological functions. When this occurs the animal enters the pre-pathological state, is at risk of developing a pathological state and experiences distress.

Thus, pre-pathological changes, such as alterations in immune function, may lead to pathological changes such as lesions in the lungs or abomasums of veal calves. These types of lesions are increasingly being recorded at slaughter as a reliable indicator of the welfare state of the animal while it was alive. Such indicators can be used to differentiate between housing and management systems, or even between different animal producers.

Whereas the use of pathological indicators is generally accepted, there are many difficulties in using subclinical changes as indicators of reduced welfare (Rushen and de Passillé, 2009), most of which arise from the fact (Dawkins, 2006, p. 79) that:

[These changes] can be difficult to interpret in welfare terms because many of these changes are part of the adaptive way in which an animal responds to its environment, and because apparently pleasurable activities, such as sex and hunting prey, can lead to similar changes to those that are apparently unpleasant, such as escaping a predator.

Furthermore, equating any sign of stress with reduced welfare can be particularly dangerous because (Moberg, 2000, p. 1):

Stress is a part of life and is not inherently bad ... Our challenge is to differentiate between the little non-threatening stresses of life and those stresses that adversely affect an animal's welfare.

Hence, such subclinical physiological or immunological changes can only be used to assess animal welfare if they are directly associated with some suffering, or are likely to result in chronic changes that will threaten animal welfare in the future, for example by causing poor health.

It may seem evident that a farm animal's productivity will also reflect its welfare; a dairy cow with poor welfare will produce less milk, and a pig or broiler chicken in poor conditions will grow less well (see, for example, Curtis, 2007). Yet the relationship between the welfare of an animal and its productivity is not straightforward. High levels of productivity often result from specific practices, such as the use of growth enhancers (hormones, antibiotics, etc.). Furthermore, there is increasing evidence that genetic selection for fast growth in broiler chickens and pigs, and for high milk production in dairy cows, is associated with an increased occurrence of certain health problems (Rauw et al., 1998). Clearly, the relationship between an animal's welfare and its productivity is controversial.

Likewise, it may seem evident that reproduction is a sign of good welfare and that failure to reproduce, for example as it occurs in some animals in zoos, is a sign of a welfare problem. However, this does not mean that reproductive success can always be used to assess welfare. When reproductive problems arise because of poor health, this is undoubtedly a sign of poor welfare, but differences among farms in reproductive failure could be due to many factors that are not related to the welfare
of the animals, such as success at oestrus detection, effective artificial insemination strategies and general reproductive management. Indeed, reproductive success itself can be a major threat to the survival of individuals, a fact that is most apparent in wild animals. In discussing the use of measures of reproductive fitness to assess welfare, Dawkins (1998, p. 73) states that the main problem is that:

Animals have been selected to reproduce, not just to live a long time as individuals. A consequence of gene level selection is that the health, longevity and even survival of individual animals may be reduced in the interests of gene propagation. A very obvious example of this is the considerable costs, including reduction in physical health, that occur in animals during the breeding season.

Barnard and Hurst (1996) provide more subtle examples from laboratory rodents of how increased reproductive success is sometimes achieved at the expense of the welfare of the individual animals: high testosterone levels, which are a necessity to achieve high reproductive success in male mice, are immunosuppressive and can increase the animal’s susceptibility to disease.

In summary, changes in productivity or reproduction due to stress or poor health, and which involve the animals suffering in some way, can serve as indicators of changes in animal welfare, but the relationship between the welfare of animals and their productivity or their willingness or ability to reproduce is not a simple one.

2.5 Welfare, Natural Behaviour and the ‘Nature’ of Animals

It is the ‘unnaturalness’ of modern housing conditions and management practices, even with species that have been domesticated for several thousands of years, that is one of the greatest concerns of the public. The possibility that farm, laboratory and zoo animals are suffering because they cannot perform behaviour that they would normally perform in a more natural environment is one of the enduring concerns. The Brambell Committee drew particular attention to the problems of behavioural restriction and frustration that result from intensive indoor housing systems for farm animals. In the appendix to this report, Thorpe (an ethologist) wrote (Brambell Committee, 1965, p. 79):

We must draw the line at conditions which completely suppress all or nearly all the natural, instinctive urges and behaviour patterns characteristic of actions ... as found in the ancestral wild species and which have been little, if at all, bred out in the process of domestication.

As a result of this, some of the earlier research in farm animal welfare involved attempts to determine how much modern breeds of farm animals have retained the behavioural repertoire of their evolutionary ancestors (Jensen, 1989) (Fig. 2.5). Also, many of the improvements in the housing of zoo animals have come from developing enclosures that provide a more natural environment (Fig. 2.6).

It is very appealing then, when faced with uncertainty about the best way to keep animals, to say they should be kept in a natural environment. But what is natural for a domestic dog such as a chihuahua, a highly selected, artificially inseminated farm animal, or a genetically modified mouse? As David Fraser (2008, p. 174) says:

Although there are many examples of animal welfare problems caused by artificial conditions, looking in ‘natural’ environments as a way to safeguard animal welfare raises serious difficulties. For a given species it may not be possible to identify a ‘natural’ environment, nor, for practical reasons, to recreate it; and the problem is further compounded for animals with a long history of domestication.

For most animals, it seems society has already taken a pragmatic view. People want to be able to come close to wild animals at the zoo, have pets for companionship and so on. Some forms of restriction compared with the natural environment are therefore accepted. The question for animal welfare is the extent to which animals should be able to show natural behaviour, rather than the extent to which their environment should be natural. For example, populations of herring gulls (Larus argentatus) and lesser black-backed gulls (Larus fuscus) are very successful in Europe through living in very artificial environments. Rather than living by and from the sea, they forage in garbage dumps, nest on buildings and roost on playing fields, but these artificial environments allow the performance of natural behaviour (Duncan, 1995). The ubiquity of the concept of ‘natural behaviour’ suggests that it does capture some of the disquiet that modern farming systems provoke in many people, despite reservations by some scientists (Spinka, 2006; Broom, 2008).

However, there is a problem with the notion of encouraging natural behaviour, and that is that not all natural behaviour is desirable. Flight reactions
Fig. 2.5. An argument raised against some modern, intensive housing systems is that they do not allow animals to perform their natural behaviour. Critics of this point of view argue that modern farm animals have been subjected to artificial selection for many generations and have lost much of their natural behaviour. This has led to experiments in which modern breeds of farm animals have been released into semi-natural environments. Despite generations of being housed in farrowing crates, modern domestic pigs will show typical nest-building behaviour when given the opportunity, showing that they have retained much of their evolved behavioural repertoire.

Fig. 2.6. Knowledge of the natural behaviour of zoo animals in particular can provide useful guidelines to improve their housing. In the case of a primate, providing ropes or other appropriate structures will allow them to perform this behaviour, most likely improving their welfare, while also entertaining zoo visitors. Photo by Yezica Norling.
in response to real or perceived predators are adaptive in the wild, but under confined conditions this can lead to problems, for example panic reactions in poultry flocks that lead to birds suffocating under a pile of other birds (Hansen, 1976; Mills and Faure, 1990). Aggression and the establishment and maintenance of the social hierarchy is natural for many of our domesticated species, but there can be negative consequences for the low-ranked animals if there are limited resources or insufficient space to escape. For many species of farmed fish, those individuals that are more aggressive will catch more food from the feed dispensers and thus have better growth rates. None the less, this better growth for some individuals is achieved at the expense of other fish that not only grow less well, but are injured in the process of competing for food (Brännäs et al., 2008). Infanticide is a natural behaviour of many primates, seen in many natural habitats (Hiraiwa-Hasegawa, 1988), but it is not a desirable behaviour to see in zoo settings, either for the welfare of the animals or the zoo visitors. Thus, natural behaviour, while enhancing the welfare of one individual can at the same time lead to a reduction in welfare for another individual in the same group.

To understand better the relationship between natural behaviour and animal welfare, we need also to understand the evolutionary background of our domesticated animals. Dawkins (2006), in her paper entitled 'A user's guide to animal welfare science', promotes an evolutionary approach and says that:

Behavioural ecologists have a major role to play in understanding the mechanisms by which different species respond to threats to their fitness and thus in defining what constitutes 'welfare.'

But also that:

Paradoxically, it is evolved mechanisms for coping with anticipated threats to fitness ... that causes more concern about welfare than the direct threats themselves.

So here lies the crux of the problem when using a natural behaviour approach to answer questions about animal welfare: what is natural is not necessarily appropriate in our artificial environments and what is appropriate in our artificial environments is not necessarily what comes naturally to our domesticated animals.

Owing to the difficulties with the concept of 'natural behaviour', scientists have refocused their attention on trying to understand which behaviour is important for the animal to be able to perform in order to have good welfare. This research has often been done using the term 'behavioural need'. For example, scientists proposed that in the absence of the environmental trigger, natural behaviour is important to the animal only if it is internally motivated and if the performance of the behaviour itself is important in providing the appropriate feedback to the animal. For example, dairy calves usually suck to get their milk, but on many modern farms calves are fed from a bucket and do not need to suck in order to consume their milk. Despite this, research has shown that the performance of sucking behaviour itself plays a role in satisfying the calf's feeding motivation, independently of the intake of milk (Rushen et al., 2008). Furthermore, if the calf is prevented from performing this behaviour in its normal context, it will be likely to continue to show the behaviour but in an abnormal fashion, for example, by sucking another calf (Fig. 2.7). Thus, the importance of a behaviour pattern for animal welfare depends on its source of motivation (see Chapters 7 and 9).

In addition, it is widely recognized that the emotions of animals play a major role in behavioural motivation. It has been suggested that negative feelings, such as pain, fear and frustration, occur most in 'need situations', that is, where immediate action by the animal is required. In contrast, positive feelings, such as pleasure and excitement, occur more in 'opportunity situations' and increase the likelihood that the animal will perform the behaviour, even where the fitness benefits are far in the future (Fraser and Duncan, 1998). Fear is an example of a negative feeling associated with motivating an animal to escape from a predator. Pleasure is an example of a positive feeling associated with the performance of play behaviour. In other words, feelings are part of the natural selection process that allows survival mechanisms to act. Some of this relationship is captured in one of few recent attempts to define natural behaviour (Bracke and Hopster, 2006):

Natural behaviour may be defined as behaviour that animals have a tendency to exhibit under natural conditions, because these behaviours are pleasurable and promote biological functioning.

The difficulties with the concept of natural behaviour do not mean that we cannot benefit
Fig. 2.7. A dairy calf cross-sucks another. A calf's natural behaviour to obtain its milk is to suck on its mother's udder. In modern farming, calves often drink milk from a bucket. However, calves will often continue to show sucking behaviour, but in an abnormal context. The fact that animals continue to show behaviours such as this, even when they are no longer 'necessary' to achieve their usual function, show that the performance of the behaviour is important to the animal.

from a better knowledge of the natural behaviour of domestic animals. Matek Špinka (2006) proposes three examples of the importance of natural behaviour to good farm animal welfare:

First, it is often more efficient to allow animals to satisfy their own needs and achieve their goals than to address these needs and goals through technical means. Second, a larger class of natural behaviours is associated with positive affective experience, and thus their performance directly enhances animal welfare. Third, the performance of natural behaviour in its richness and complexity often brings long-term benefits for the animal, such as improved proficiency in coping with social and physical challenges.

In summary, while freedom to perform the whole repertoire of natural behaviour is not crucial for an animal's welfare, the opportunity to perform natural behaviour may be an effective way to improve its welfare in practice.

2.6 Conclusions

- Different groups of people put emphasis on different aspects of animal welfare. These different aspects are interconnected and revolve round the same key issues.
- The physiology and behaviour of animals have evolved to maximize health and fitness under natural conditions. Feelings have evolved as a "tiekline mechnisms of natural behaviour..."
- Negative feelings motivate behaviour in situations where immediate action is required.
- Positive feelings motivate behaviour in situations where no immediate action is required but where there is a long-term benefit. There is growing acceptance that it is negative feelings that reduce welfare and positive feelings that improve it.
- Work on health is increasingly being directed towards preventing and understanding the impact of reduced health on an animal's welfare.
- Because of the central role played by feelings, it seems likely that future research will be increasingly directed towards cognition and emotions in animals.

References


