Independent Inquiry into Dog Breeding

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Dogs Trust is thanked for the photograph on the title page

The full report can be downloaded from <www.dogbreedinginquiry.com>

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Preface

The structure of the report is as follows. After an introduction to the dog and its domestication, the second chapter discusses scientific advances in the assessment of animal welfare. The third chapter deals in general terms with the genetics of inbreeding. The fourth chapter summarises the response to my call for evidence and the fifth summarises what was learned from the interviews conducted over the summer. The sixth chapter deals with the central problem of poor welfare that has arisen in the course of breeding dogs and the seventh chapter discusses ways forward in order to improve matters. The eighth chapter gives my recommendations.

The background to the Inquiry was a showing by the BBC on 19 August 2008 of a television documentary called *Pedigree Dogs Exposed*. It was a hard-hitting piece of journalism written and directed by Jemima Harrison. It was aimed at those breeders of pedigree dogs who had ignored the adverse effects of inbreeding and particularly those who were breeding for extreme conformations. The United Kingdom's premiere dog club, the Kennel Club, felt that it had been unfairly treated and complained to OfCom, the regulator of the UK Communications industry. At the time of writing, this dispute has not been settled. Nevertheless, the BBC pulled out of its long-standing arrangement to televise Crufts dog show. Moreover, the public reaction was such that Dogs Trust, the Royal Society for the Prevention of Cruelty to Animals and the People's Dispensary for Sick Animals ended their support; and Pedigree Petfoods and Hills Pet Nutrition cancelled their sponsorship of the show. The Associate Parliamentary Group on Animal Welfare (APGAW) announced that it would hold hearings on the breeding of pedigree dogs. At the same time the Kennel Club combined forces with a leading dog charity, Dogs Trust, and announced an independent Inquiry into the breeding of all dogs.

I was first telephoned in December 2008 by Mr Henry Hoppe, a senior official of the Department for the Environment, Food and Rural Affairs (Defra), and asked whether I would be prepared to lead an Inquiry into the breeding of dogs. I said that I would. On 9 January 2009 I duly met Mr Hoppe, Mrs Clarissa Baldwin, who is Chief Executive of Dogs Trust, Mrs Caroline Kisko, who is Secretary of the Kennel Club, some staff members of both organizations and some additional officials from Defra. I told them that I had not kept a dog in recent years, had no experience of dog breeding though I did breed pedigree cats in a small way (Russian Blues and Egyptian Maus), that I was not uncontroversial after I had led an Inquiry for the National Trust into the hunting of red deer with hounds, and that I had already made many unalterable commitments in 2009. The Kennel Club and Dogs Trust were content, nevertheless, that I should lead the Inquiry. My remit as stated for a review board is given in Appendix 1. The funders of the Inquiry agreed that I should be helped by a senior person who had experience of drafting minutes of meetings and drafting text for the report. I duly appointed Mrs Heather Peck who had led the Animal Welfare Section of Defra before her retirement. Our biographies are given in Appendix 2.

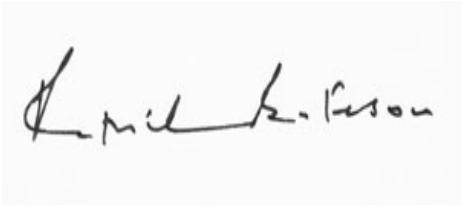
Heather Peck has proved an excellent colleague and, even though this report is written in the first person, its preparation has emphatically been a collaborative effort between us both. After consultation, I appointed an Advisory Committee consisting of two geneticists, two animal welfare experts, three clinical veterinarians and a practicing veterinary surgeon. One of the geneticists was also a dog-breeder of long-standing. Details of the Advisory Committee are given in Appendix 3.

On 29 January 2009 I met Eric Martlew MP, Chairman of APGAW. Although the remit for his inquiry was narrower than mine (see Appendix 4), we agreed to exchange evidence. It was important that we should do so, since the two inquiries overlapped and were both triggered by the same BBC programme.

On 12 February I issued a call for evidence, details of which are given in Appendix 5. A substantial period of time was allowed for evidence to be prepared and the deadline for submission was set for 15 May 2009. The evidence was distilled and presented to the Advisory Group which met for the first time on 1 June. The Group worked well together and recommended people that Heather Peck and I should interview. The rest of the summer was devoted to interviews, visiting dog shows and dog breeders. We began to

formulate conclusions that we presented to the Advisory Group when it met again on 10 September.

At the end of October a draft of the report was distributed to the funders of the Inquiry, Defra officials, the members of the Advisory Group, and five anonymous referees nominated independently by the Association for the Study of Animal Behaviour, the British Veterinary Association and the Genetics Society. This draft did not include the recommendations in Chapter 8 or the Executive Summary. Comments on the draft report were received by the end of November and the report was completed in December, its format was designed by me and delivered to the printer after Christmas. The funders were shown the final report 72 hours before its official publication on 14 January 2010. Otherwise, nobody (apart from Heather Peck) has seen my firm recommendations given at the end of the published version of this report.



Patrick Bateson
Cambridge
January 2010

Executive Summary

The Inquiry into dog breeding was headed by Professor Sir Patrick Bateson FRS. It was funded by Dogs Trust and the Kennel Club but was conducted independently of both organisations. The Inquiry received the advice of dog breeders as well as experts in genetics, animal welfare, and veterinary surgery and the report was anonymously peer reviewed by five experts in the three scientific fields. Throughout the Inquiry Professor Bateson was greatly assisted by Mrs Heather Peck.

The report opens with an account of the domestication of dogs and the astonishing variety of forms and behaviour that have been generated by artificial selection. It also considers the wide variety of ways in which dogs assist humans and are used by them.

As background to the Inquiry, the science of animal welfare and the freedoms that should be granted to sentient animals are reviewed. The observations and assessments that can be utilised to measure welfare include: any physical damage to the animal, physiological and behavioural states that would be found in suffering humans, the extent to which the animal has been required chronically to operate homeostatic mechanisms that would normally operate acutely, the extent to which it behaves abnormally, and the animal's preferences when given a choice. Consideration is also given to the ecological conditions to which the animal is adapted, its normal social structure and whether or not it can express patterns of behaviour to which it accords high priority.

The genetics of inbreeding are reviewed. Animals that are inbred are less likely than optimally outbred animals to survive and less likely to reproduce. Inbreeding can result in reduced fertility both in litter size and sperm viability, developmental disruption, lower birth rate, higher infant mortality, shorter life span, reduction of immune system function, and increased frequency of genetic disorders.

A call for evidence by Professor Bateson received 135 written responses including 58 from breed clubs, 21 from breeders, 16 from veterinary surgeons, other scientists or academic institutions, 13 from dog or animal welfare charities and 10 from pet owners. Widespread concern was expressed about dogs that are farmed and bred for profit, sometimes on a large scale. The need for statistically significant and robust prevalence data of inherited disorders was listed as the key research need by everyone who addressed the topic. The balance of opinion was strongly in favour of action to resolve the worst abuses of current breeding practices, provided both that controls or standards apply equally to all dogs (not just pedigree or pure-breeds) and that the details of breeding strategies are breed or cross-breed specific.

Professor Bateson and Mrs Peck visited four dog shows and interviewed 50 individuals including politicians, civil and public servants, scientists, veterinary surgeons, dog breeders, and representatives of animal care charities. The subjects of the interviews covered existing academic research and the challenges that needed addressing in terms of prevalence of disorders and corrective surgery. Views on the current welfare problems and potential solutions to them were obtained from breeders and breeder organisations, pet nutrition and marketing businesses, and dog rescue and re-homing charities. Advice was also given on legal and enforcement challenges.

A draft report was prepared at the end of October and independently peer-reviewed by five anonymous experts in genetics, animal welfare and veterinary surgery. Their comments were received by the end of November and incorporated into the final report.

Many breeders exercise the highest standards of welfare, are passionate about caring for their dogs properly and take great trouble to ensure that their puppies go to good homes. Nevertheless, current dog breeding practices do in many cases impose welfare costs on individual dogs from a variety of causes including the following: negligent or incompetent management with a particular impact on breeding bitches but also including failure to socialise puppies appropriately; use of closely related breeding pairs such that already high levels of inbreeding are worsened; use of breeding pairs carrying inherited disorders such that inherited disease is transmitted to offspring; artificial selection for extreme characteristics that are directly responsible for failure to meet one or more welfare criteria; and the sale of dogs that are unsuited to the conditions in which they will be kept by their owners.

Improving the situation will require cooperation and action at many different levels and by many differ-

ent people: research scientists, the specialist dog breeders and the clubs to which they belong, the veterinary profession, the dog protection and re-homing charities, the members of the public who buy dogs, Local Authorities, Central Government and Devolved Administrations, when breaches of the law persist. The means for effecting change are those that encourage, guide and (where necessary as a last resort) enforce beneficial changes in the behaviour of those connected with the breeding of dogs.

The best available science and advice should be provided to breeders to guide their efforts, together with harnessing the knowledge, skill and commitment to welfare that already exists within the dog breeding community. Those breeders who deliver genuinely high welfare standards should be rewarded and recognised for their efforts, both in the show ring and in the market place.

Prospective dog owners should be advised on what constitutes good welfare in dogs, how to identify a dog breed or type suitable for their personal circumstances, and how to find a dog breeder or other source that will reliably provide a fit, healthy and appropriately socialised dog plus necessary documentation covering identification and guidance.

A non-statutory Advisory Council on Dog Breeding should be established. The key role of the Council should be to develop evidence-based breeding strategies that address the issues of poor conformation, inherited disease and inbreeding, as appropriate to the specific breed, and to provide advice on the priorities for research and development in this area.

High priority should be given to the creation of a computer-based system for the collection of anonymised diagnoses from veterinary surgeries in order to provide statistically significant prevalence data for each breed. Initially, priority should be given to collecting data with respect to the conditions creating the greatest welfare challenges in terms of pain, impact on quality of life, capacity for correction, and early age of onset. The data collected should relate both to the incidence of inherited disease and to the incidence of veterinary procedures necessary to correct faults due to selection for extreme morphologies.

Those drafting Breed Standards should have regard to the need to avoid the selection for extreme morphologies that can damage the health and welfare of the dog and to the guidance of the Advisory Council on Dog Breeding when available. Where a problem within a breed already exists, the Breed Standard should be amended specifically to encourage the selection for morphologies that will improve the welfare status of the breed.

An upgraded Accredited Breeder Scheme should be implemented guaranteeing among other matters that all pre-mating tests for inherited disease appropriate to the breed or breeds are undertaken on both parents, that no mating takes place if the tests indicate that it would be inadvisable, any prospective purchaser is able to view the puppies with their mother, every puppy is identified by microchip prior to sale and all pre-sale tests on the puppy that are appropriate to the breed have been carried out; and that the duty of care which every dog breeder owes to the parent dogs and puppies for which they are responsible is fully met with regard to both health and welfare.

Irrespective of whether they are members of an Accredited Breeder scheme, all breeders should have their puppies microchipped before they are sold. Prospective purchasers should expect that this has been done before buying a puppy.

When inspecting the premises of breeders that require licences, Local Authorities should address all welfare issues covered by the Animal Welfare Act 2006, especially those relating to dog behaviour. In issuing a licence Local Authorities should specify and inspect the staffing levels necessary to ensure appropriate health and welfare, including exercise of parents and socialisation of the puppies. Breeders' records should be inspected to ensure that breed-appropriate pre-mating tests and screening programmes have been carried out with regard to both parents.

Regulations should be established under the Animal Welfare Act 2006 in order, among other matters, to require that all puppies should be indelibly identified before sale and that any person breeding dogs should have regard to the health and welfare of both the parents and the offspring of the mating. A statutory Code of Practice on the Breeding of Dogs should be established under the Animal Welfare Act 2006. Regulations should be made under the Animal Welfare Act 2006 to replace the various Breeding and Sales of Dogs Acts.

The British Veterinary Association (BVA) should compile, and provide to Local Authorities, a list of veterinary practitioners willing to carry out and/or support inspections of licensed breeding

premises. The Royal College of Veterinary Surgeons and the BVA, working with the profession as a whole, should lead a shift in emphasis to preventative veterinary medicine rather than simply the correction of problems after they have occurred.

Complementing all existing schemes, a public awareness and education campaign should be designed by expert practitioners, in order to persuade the general dog-buying public to change its behaviour in specific key respects and to provide readily comprehensible information on what questions to ask and what to look for when buying a dog. This should be supported and run by as many as possible of the dog and animal welfare organisations acting jointly and in unanimity. When available, the buying public should be encouraged to purchase only from breeders participating in a robust and audited accreditation scheme.

Chapter 1 – Introduction to the Dog

This chapter describes the domestication of dogs and the astonishing variety of forms and behaviour that have been generated by artificial selection. It also considers the wide variety of ways in which dogs assist humans and are used by them.

1.1 The selective breeding of plants and animals has had a remarkable history. Charles Darwin (1859) was struck by the extraordinary differences that could be found between domestic pigeons. He tried selective breeding himself and based his famous theory of biological evolution by natural selection on what he had learned about the malleability of species. The Victorian catalogues contain lists of literally thousands of varieties of apples and other fruit. The widely shared fascination with selective breeding of plants and animals was often driven by commercial considerations but also by a delight in generating novel and extraordinary forms.

1.2 The extent to which new forms differ from each other and from their wild ancestors is nowhere more striking than in the domestic dog. It seems scarcely credible that one of the tiny toy breeds, weighing two kilos or less and fitting inside a woman's handbag, could be derived from a wolf. Or, for that matter, that this tiny creature could be inter-fertile with a Great Dane twenty-five times its weight. A taxonomist who knew nothing about dogs would instantly declare that such distinct animals were different species.

1.3 We can only guess at how the domestication of the wolf came about. Among others, Juliet Clutton-Brock (1981) surmised how an alliance might have been formed between humans and the wolf. The women and children of the hunting communities would give succour to any animal that would stay near and young canids would be tamed along with many other animals. Most of these associations would be ephemeral, she argued, because they lacked the complicated social behaviour patterns found in wolves and humans. She went on to suggest that occasionally a particularly placid or submissive cub would survive to become an adult wolf that would accept the human group as its pack. With the correct combination of physique and temperament the socialized wolves could then be bred by humans.

1.4 Ray and Lorna Coppinger (2004) presented a radically different view of the early stages of the domestication of the wolf. They argued that the initial stage involved wolves scavenging around human settlements. The next step was one in which those individuals that were least afraid of humans were most likely to benefit from the scraps of food that they found on human rubbish dumps. Rather than involving artificial selection, the initial stage involved natural selection. This process is very similar to that proposed for the initial stages of domestication of the African wild cat attracted to human habitations because of the rodents found near grain stores. Thereafter, the process for both dogs and cats brought in the actions of humans. Juliet Clutton-Brock's ideas can then be grafted onto those of the Coppingers.

1.5 Many writers have gone on to suggest that the selective breeding by humans could have led to in-

fantilisation of the wolf, to rounder eyes, baby faces and even an expression of the human "smile"; not that these characteristics were necessary or even sufficient for subsequent selective breeding as can be seen from the variation in the modern breeds of dogs.

1.6 Whatever happened, the process may have occurred more than once in different parts of the world and quite possibly starting at early periods of human history. One dog-like fossil found in Belgium was dated at 31,700 years ago but dog fossils are rarely found before the Neolithic period when humans started to farm in earnest. The early examples of dog-like animals may have died out. Even so, some estimates based on genetic evidence have put the origin of dog domestication as far back as 40,000 years ago or even earlier but these estimates are based on assumptions that may prove to be false (Savolainen et al., 2002). Pang et al., (2009), having analysed dog mitochondrial DNA, have suggested that the domestic dog originated in southern China less than 16,300 years ago. The date coincides with the origin of rice cultivation and the establishment of farming communities in that part of China.

1.7 Once started, domestication probably occurred very rapidly. Belyaev (1969) and his colleagues carried out artificial selection experiments on the silver fox, a variant of the red fox (*Vulpes vulpes*). They selected for breeding, foxes that were least timid when a gloved hand was thrust at them and attempts were made by humans to handle them. Within 2-3 generations foxes in the selected line were much tamer. In the fourth generation some of the cubs responded to humans by dog-like tail wagging. As the experiment proceeded, more and more dog-like behaviour appeared. In the sixth generation, some cubs eagerly sought contacts with humans - not only wagging their tails, but also whining, whimpering, and licking in a dog-like manner. The changes in standard coat colour pattern appeared in the 8th-10th generation of the selected line. Piebald Star spotting and brown mottling on the background of the standard silver-black color were typical. Floppy ears and curly tails occurred in addition to changes in standard coat color. In later generations changes in the skeletal system began to appear, including shortened legs, tail, snout, upper jaw, and a widened skull (Trut et al., 2009). Proposals for the precise mechanisms of genetic regulation involved in these changes need not concern us here, but the outcome is highly relevant to understanding the rate of domestication of dogs and the development of the great variety of breeds that we see today.

1.8 Dingoes are thought to have arrived with humans in Australia 5000 years ago. Saluki-like animals appear on the ceramics from Susa and Sialk of 3500 BC in Iran, as well as on Egyptian tombs of 2100 BC. Other breeds of dog were selected for their ferocity and were used for guarding and warfare by the Egyptians, Greeks and Persians. The Romans initially trained for battle the Molossian from which the Neapolitan Mastiff is thought to have been derived. These dogs met their match in the even more powerful Mastiff of Ancient Britain. The Romans thereafter used the Mastiff as their war dog and established attack formations consisting entirely of dogs equipped with spiked collars and body armour. In modern warfare dogs have been used for scouting for mines and for sentry duties, among many other roles given to them such as regimental mascots. Hunting dogs were selected for setting or pointing when scenting game birds; others were bred for their abilities in retrieving or flushing game. Other dogs that worked well with livestock and responded to human commands were chosen for herding sheep. The exquisite sense of smell possessed by dogs has been used for tracking fugitives or, in recent times, for detecting explosives and illegal drugs. Some breeds have been selected for their speed and greyhound races attract people who bet on the outcome. The Inuit trained dogs to pull sledges and nowadays racing with trolleys or sledges pulled by dogs has become an exciting sport. Some dogs become star performers in circuses and elsewhere. The therapeutic effects of their companionship has been proposed and increasingly accepted (Wells, 2009). In recent times assistance dogs for humans have been developed to the great benefit of owners with many forms of disabilities and medical conditions. The identification of the genetic mutation responsible for canine narcolepsy led to the same mutation being identified in human narcolepsy, leading to huge advances in the understanding of this genetic disease (Lin et al., 1999). In parts of Asia dogs are regularly eaten by humans. Dogs are used for enhancing prestige or for intimidation and bred for illegal fighting. As their qualities both good and bad have been realised, they have become commodities in the eyes of some and sold in enormous numbers to members of the public.

1.9 The great variety of dogs is most clearly seen by the public in dog shows, the most famous of which is Crufts. Breed clubs started to form in the nineteenth century and the first dog show in the United Kingdom was in 1859, the same year that Charles Darwin published *The Origin of Species*. As the showing of dogs became popular, standards for each

breed were established. These standards are usually based on the conformation of the dog. They are necessarily arbitrary and often imprecise. Breeding competitively to succeed in shows has become a major preoccupation of hobbyists and professional breeders alike and in some cases has led to major changes in the conformation of breeds and to distinct differences between show dogs and working dogs ostensibly of the same breed. Most breeders produce at most only one or two litters per year. According to UK Kennel Club records, 77% of breeders have one litter per year which accounts for half of the registered puppies.

Credit: M.Henrie /Kennel Club Picture Library
Saluki

Credit:D.Pearce /Kennel Club Picture Library
Chow Chow

1.10 The UK Kennel Club recognises over 200 different breeds and divides dogs into seven groups: Hounds (including Beagles, *Afghan hounds, Basenjis* and *Salukis*), Gundogs, Terriers, Utility dogs (including Bulldogs, *Japanese Akitas, Chow Chows, and Chinese Shar-Peis*), Working dogs (including Boxers, *Alaskan Malamutes* and *Siberian Huskies*), Pastoral dogs and Toy dogs. However, analysis of microsatellite genotypes of the dogs and the wolf suggest that some of the dogs (in italics above) that are grouped together with modern breeds are very ancient and should be classified separately (Parker et al., 2004). The analysis also demonstrated the arbitrary ways in which breeds are described and classified on body conformation alone.

1.11 The increase in the world's population of dogs (now estimated to be 400 million) reflects that of humans. Dogs are found in every part of the world that is inhabited by humans (except perhaps scientific stations in Antarctica). Today more than 400 breeds of domestic dog are recognized (see <en.wikipedia.org/wiki/List_of_dog_breeds>). The number of dogs in the United Kingdom is variously estimated at between five and eight million. Extrapolating from household surveys, Mars Petcare Ltd obtained the higher figure of more than eight million and estimates that about half the dogs kept as pets are singletons, a quarter are kept in pairs and the remainder are kept in groups of three or more. The Pet Food Manufacturers Association estimates that, in the six million UK households that keep dogs as pets, 75% are pedigree dogs, 11% are crossbreeds, and 14% are of mixed breed. By no means all of the pedigree dogs are registered with the Kennel Club.

1.12 The companionship of pet dogs usually gives great pleasure to their human owners. Dogs that have been handled by humans from an early age generally make strikingly better pets than those that have not been treated in this way. The role that early experience can play in the formation of attachments was first made famous by Konrad Lorenz (1935) working on ducks and geese. He called the process "imprinting". A similar process was later found in many mammals but it was first described in dogs by Scott & Marston (1950). Like Lorenz they supposed that the process must occur within a critical period in development. Subsequently the attachment process

Credit: The Kennel Club Picture Libtrary
Siberian Husky

has proved to be more flexible and the outcome more variable than was at first supposed. In dogs, the period over which such exposure to humans is effective probably extends to well after the puppies start to take solid food (Serpell & Jagoe, 1995). The precise amount of contact is not critical – little and often from early on is a good way of establishing a bond. If that is not possible, much more contact from six weeks after birth is an acceptable alternative. Leave the contact too late, roughly 12 weeks after birth, and the puppy will not generally make a good pet. However, under special conditions dogs that have not been socialised to humans early in life may subsequently become deeply attached to humans. Finally, unlike some birds, well-socialised dogs do not usually direct all their adult sexual and social behaviour at humans - which is perhaps fortunate.

1.13 The literature on domestic dogs is vast and many breeds have attracted monographs. I should mention one classic book, *The Genetics and the Social Behavior of the Dog* by Paul Scott & John Fuller (1965). James Serpell's (1995) edited collection contains chapters by world experts and remains an authoritative source of information. The book by Ray & Lorna Coppinger (2004) is a delight to read and Adam Miklósi (2007) has updated much of the scientific literature on the remarkable behavioural capabilities of the dog. A good article on "Dog" is to be found on Wikipedia <http://en.wikipedia.org/wiki/Dog>. I shall return to some of the detailed work in later chapters.

Chapter 2 – Assessment of Animal Welfare

The science of animal welfare and the freedoms that should be granted to sentient animals are reviewed. The observations and assessments that can be utilised to measure welfare include: any physical damage to the animal, physiological and behavioural states that would be found in suffering humans, the extent to which the animal has been required chronically to operate homeostatic mechanisms that would normally operate acutely, the extent to which it behaves abnormally, and the animal's preferences when given a choice. Consideration is also given to the ecological conditions to which the animal is adapted, its normal social structure and whether or not it can express patterns of behaviour to which it accords high priority.

2.1 Many people simply *know* what it is like to be a dog. Such certainty is not enjoyed by those who frame laws or by those whose job it is to measure animal welfare. Even so, almost everybody would agree that dogs are sentient. Those who drafted the Animal Welfare Act 2006 attempted to define welfare in terms of a sentient animal's needs (the Five Freedoms). These include its need for a suitable environment, suitable diet, the ability to exhibit normal behaviour patterns, being housed with or apart from other animals and protection from pain, suffering, injury and disease. In livestock farming, attempts have been made to determine what can be described as a "good life" from the point of view of the animal (Botreau et al., 2007). The key welfare principles are good feeding (absence of prolonged hunger or thirst), good housing (comfort and ease of movement), good health (absence of injuries, disease and pain induced by management procedures) and opportunity for performance of appropriate behaviour with a good relationship with humans and accompanied by a positive emotional state.

2.2 Freedom to perform "normal behaviour", as specified in the Animal Welfare Act 2006 or "appropriate behaviour" as specified in Botreau et al.'s paper is difficult to pin down in an animal that has been bred for human purposes. The animal may have lost some of the repertoire of its wild ancestor and, in some dog breeds, may have had its repertoire increased by artificial selection on the part of human breeders. Some of the toy and sleeve dogs may have been bred selectively to accept constrained lives. These considerations suggest that what applies to one breed may not apply to another. Selective breeding to accentuate human-orientated behaviour has led to dogs that suffer if they do not receive adequate human attention (Bradshaw et al., 2002).

2.3 If a dog is observed in a barren environment doing little other than feeding and resting it is difficult to know whether all is well, or whether something important is missing. The dog might be content, or it might be frustrated because the resources that would allow it to carry out a wider range of activities are absent. Observations of feral or free-ranging dogs are therefore also useful in revealing which capacities have been retained and which have been lost. Such observations show that dogs retain very considerable complexity of behaviour. Can dogs have good welfare if a given environment constrains them from performing a wide range of different activities? In small cages many animals develop what are known as stereotypies, the repeated performance of the same act such as pacing round and round the cage (see Hewson et al., 2007). However, simply comparing the behaviour of a captive animal with that of its wild or feral counterpart is not sufficient to draw conclusions about animal welfare. We need to know much more. It is already clear that breeds exhibit different ranges of behavioral signaling so it is likely that they will display different behavioural responses under identical conditions (Goodwin et al. 1997).

2.4 Without any question, public concern about the welfare of sentient animals has grown enormously in recent years. In a well-known report Donoghue (2007) described the conditions in which racing greyhounds were kept and considered how the lot of these dogs could be improved. I have discussed elsewhere the various reasons why people are concerned about the way that animals are treated and the ethical basis for providing good welfare for animals (Bateson, 2005). What follows is a brief discussion of how far scientists have got in making transparent their assessments of welfare both bad and good.

2.5 For a start, proper account should be taken of the special adaptations to the ecological conditions

in which the animal evolved. Dogs can experience subtle odours and high-pitched sounds that humans are unable to detect and, therefore, do not regard as being important. When an animal does not behave as humans would in the same circumstances, humans should be sensitive to its requirements, the way in which it has been reared, the details of its social life under natural conditions and the impact of its evolutionary history. These considerations can be salutary since health - and survival even - may be sacrificed by animals in the interests of attempting to win a mate (Barnard & Hurst, 1996).

2.6 Isolation from other members of its own kind may be traumatic for an individual belonging to a gregarious species such as the dog. On the other hand, social animals that have been kept in isolation for a long time may be stressed when they are introduced once more to members of their own species. Dogs may also struggle to adapt to practices such as early weaning, or even to environments that provide them with little opportunity to make choices and exert some degree of control over events. Failure to adapt may be detectable only by subtle signs. This issue is important when dogs are housed badly (see Rooney et al., 2007).

2.7 The existence of pain and suffering is a crucial aspect of poor welfare. However, pain and suffering are subjective sensations. How may they be measured in an animal? It is possible to ask about the extent to which physiological states associated with the subjective sense of suffering experienced by humans are found in animals that might be suffering. Such assessments are based on the plausible assumption that many physiological mechanisms concerned with maintenance of internal state are less likely to change in the course of evolution than those involved in the control of behaviour. This is because the internal environment is much the same in animals that are adapted to a wide variety of different habitats. The big evolutionary changes have largely come in the behavioural mechanisms that relate to the external environment.

2.8 A powerful line of evidence for pain and suffering comes, then, from using knowledge of human physiology as a guide to the animal's state. Undoubtedly this is the implicit assumption of most veterinary surgeons when dealing with the issue of pain in animals. At the most obvious level, the veterinary surgeon would look for evidence of physical damage and signs of deviation from what is normal in that type of animal. The reasoning is sound because pain fibres identical to those found in humans exist in dogs and other mammals. The pattern of electrical activity in the somatosensory cortex of dogs, in response to electrical stimulation of the pulp of a tooth, is similar to that evoked in the analogous area of human cortex (Chudler & Dong, 1983).

2.9 It is also possible to provide criteria that are based on modern methods of measuring behaviour and analysing the functional character of the nervous system. If the animal stops activities that it habitually performs in conditions that might be supposed to produce pain, if it learns how to avoid such conditions, and if it has parts of its nervous system dedicated to avoidance of damage or disturbance of its internal state, then grounds exist for believing that it feels things in much the same way as a human does. These concerns are made much more acute if it has a large brain relative to its body and shows some of the cognitive capacity seen in humans.

2.10 Humans are prepared to generalise from their own feelings, emotions and intentions to other human beings. If it is rational to do that, it is no less rational to extend the generalisation to other species (Bateson, 1991) The general point is that the basis for judgments about pain and suffering in animals can be made relatively transparent.

2.11 Analgesics may relieve a welfare problem caused, say, by inherited disease. An ingenious way of quizzing animals about the effectiveness of an analgesic was developed by Colpaert et al. (1980). They tested the response of animals to analgesics when in a state that might be expected to be painful on the basis of what is known about humans. They knew that normal rats drink sugar solution rather than water containing an analgesic. Rats with chronically inflamed joints similar to those in an arthritic person preferred to drink the solution containing the analgesic. This approach has not yet been extended to dogs, although anecdotal evidence suggests that use of analgesics can help dogs that have been presumed to be suffering in silence.

2.12 Some authors focus on the conditions that push an animal's capacity to adapt to changing conditions outside normal limits. The quality of an animal's welfare is determined, therefore, by judging the animal's "state as regards its attempts to cope with its environment" (Broom, 1986). Animals maintain their internal state within certain limits. Movement outside those limits is

countered by behavioural and/or physiological reactions that operate to bring the state, which might be body temperature, within the limits. With the exceptions of animals trying to win mates or exploring their environment, stress may arise when attempts to return the internal state to the optimum persistently fail. This then generates a welfare problem.

2.13 How can the state of an animal be assessed? Marian Dawkins (1980) has been the pioneer in arguing that one way to penetrate the motivation of an animal is to question it by behavioural means, giving the animal a choice. Expressing a choice can be made more telling by asking how much the animal is prepared to pay for its choice. For example, Cooper & Mason (2001) made captive mink work for a variety of resources by requiring them to push a heavily weighted access door. They varied the weight of the door to see how much the mink would 'pay' to reach different resources such as extra space, an extra nest site, novel objects, toys and a water bath. The mink pushed against heavy doors particularly to reach swimming water. Indeed, so keen were these smallish animals, weighing considerably less than a kilo themselves, they would push open a door with 2 kg of weight added to it.

2.14 Finally, a new approach to the measurement of the animal's state is to measure its "cognitive bias" or its willingness to take risks (Mendl et al., 2009). The underlying assumption is that, just as a depressed human tends to be risk averse, an animal in a poor state of welfare will be less willing to attempt a course of action that it has not previously experienced. A variety of techniques are being developed to assess how ready the animal is to respond to cues that differ from the ones with which it has been trained.

2.15 The scientific approach to the problems of assessing suffering in animals has to be evidence-based and collecting evidence requires orderly methods. Many debates about what should and should not be measured in welfare studies suggest that a variety of approaches are more likely to benefit understanding than a single approach. By no means will all assessments give the same answer (Nicol et al., 2009). Nevertheless, a multi-pronged approach is also more likely to reflect the various classes of problem that lie behind a concern for the quality of an animal's life. All of the following approaches contribute to an assessment of adverse welfare:

a. Considerations of the ecological conditions to which the animal is adapted, its normal social structure and whether or not it can express patterns of behaviour to which it gives high priority.
b. Observations of the extent to which it performs abnormal behaviour such as stereotypies.
c. Assessments of physical damage to the animal.
d. Measurement of clinical signs and deviations from what is considered normal.
e. Measurements of physiological and behavioural states that would be found in suffering humans.
f. Measurement of the extent to which the animal has been required chronically to operate homeostatic mechanisms that would normally operate acutely.
g. Measurement of the animal's preferences.

2.16 Poor welfare is not all-or-nothing. In attempting to deal with this issue, Collins et al. (submitted) have developed a severity index (the Generic Illness Severity Index for Dogs) which assesses the impact of a disorder on the individual dog by scoring four factors – the likely prognosis of the problem, the extent of treatment required, complications that arise and assessments of the dog's quality of life. The higher the overall score, the worse the welfare problem. A low score may indicate that the dog is in a passable state of welfare, but most people who love their pets want them to be in an excellent state. Hewson et al. (2006) reviewed the methods for assessing quality of life in dogs. I shall return to the specific welfare problems raised by dog-breeding in Chapter 6.

Chapter 3 - Genetics and Inbreeding

The genetics of inbreeding is reviewed. Animals that are inbred are less likely than optimally outbred animals to survive and less likely to reproduce. Inbreeding can result in reduced fertility both in litter size and sperm viability, developmental disruption, lower birth rate, higher infant mortality, shorter life span, reduction of immune system function, and increased frequency of genetic disorders.

3.1 Any thoughtful breeder of dogs should be concerned about the potentially adverse effects of inbreeding, but breeders are typically faced with a dilemma. Their impulse is typically to go for purity in order to fix desirable qualities and, if that means mating two dogs that are closely related, desire for purity often wins over any fears about inbreeding too much. The conflict between preserving desirable characteristics and avoiding the potentially unfavourable outcomes that may accompany inbreeding is real. Before exploring this dilemma any further, it is worth clearing up some common confusions.

3.2 Some breeders will tell you that they are not inbreeding, they are 'line breeding'. What is meant by this is that the breeder is carefully selecting mates on the basis of a detailed knowledge of their genealogy and their family's breeding history. Sometimes this is done to avoid perpetuating a recognisable inherited disease. More usually they are choosing mates carefully to generate, it is hoped, prize-winning characteristics. I shall have more to say about both these actions by breeders in Chapter 6, but either way, if the breeder mates, say, grandfather with granddaughter, he or she is inbreeding and doing so to a marked extent.

3.3 If inbreeding versus line breeding is a distinction without a difference, another confusion arises where two different ideas have been run together, namely inbreeding and incest. Incest is a culturally-transmitted prohibition which, in my view, should be applied exclusively to humans. The reluctance to mate with a close relative is an inhibition found in many other animals apart from humans (Bateson, 2004). Incest taboos may have arisen indirectly from inbreeding inhibitions, but the taboo is often applied to individuals who are not genetically related. The back of the Church of England's Book of Common Prayer states, among other restrictions, that a man may not marry his wife's father's mother or his daughter's son's wife. The mind boggles at the possibility, but clearly no genetic relationship is entailed here.

3.4 Unquestionably inbreeding can lead to a loss of biological fitness. The animals in the inbred lineage are less likely to survive and less likely to reproduce than animals in more outbred lineages. This has been demonstrated many times in well-studied, naturally outbreeding species. Inbreeding can result in reduced fertility both in litter size and sperm viability, developmental disruption, lower birth rate, higher infant mortality, shorter life span, increased expression of inherited disorders and reduction of immune system function. The immune system is closely linked to the removal of cancer cells from a healthy body (Smyth et al., 2006), so reduction of immune system function increases the risk of full-blown tumours. Many of the effects of inbreeding have been found in isolated populations of wolves, the wild ancestors of domestic dogs, with detrimental effects (Laikre & Ryman, 1991). Severe inbreeding depression has been documented in Scandinavian wolves that had passed through an extreme bottleneck (Liberg et al., 2005). During their first winter after birth the number of surviving pups per litter was strongly and inversely correlated with how inbred were the pups. The more inbred they were, the less likely were they to survive. Given what happens in wolves, domestic dogs should be no exception to the rule that breeders should avoid close inbreeding as much as possible.

3.5 Most genes of sexually reproducing species come in pairs. Each member of the pair is referred to as an allele by geneticists. Most genetic mutations, if they have any effect at all, tend to reduce or sometimes even remove a gene's function. Having genes in pairs is therefore a good thing because one good copy is usually enough, problems only arising when the members of a pair are the same (or homozygous) and both an individual's copies are defective or, in rarer cases, where the defective gene is dominant. Defective gene copies that only reduce health when a good copy is absent are called 'deleterious recessives' and are generally rare, making it extremely unlikely that their effects are felt. However, when two closely related individuals mate, the resulting offspring can inherit

the same gene copy from a single recent ancestor. If that copy is a deleterious recessive, the offspring may be unhealthy. In this way inbreeding can expose latent genetic problems by increasing the chance that an individual carries two identical, defective copies of a gene. (Inbreeding also has other effects that are described below.) When animal breeders wish to produce pure genetic lines, as they sometimes do, for example in laboratory animals, they will mate brother with sister generation after generation. Most lines die out due to the exposure of deleterious recessives that are normally hidden. However, any healthy lines that survive are likely to have lost many of the deleterious recessive genes they started with, a process known as genetic purging. Purging can occur in natural populations that are reduced to very low numbers forcing them to inbreed, and may account for why sea mammals, that went to the brink of extinction, have recovered remarkably well (Clapham et al., 1999).

3.6 Conservation is a high priority for Zoo Directors and Curators concerned with protecting rare species. Rarity may arise because the world population is small or because importing that species from the wild is illegal. Either way, this means that zoo personnel and, for that matter, wildlife managers need to keep a sharp eye on inbreeding and to be well informed about conservation genetics. Many good text-books have been written on the subject (e.g. Frankham et al., 2002).

3.7 Massive improvements in molecular techniques have meant that it has become easier to characterise the effects of inbreeding (Lindblad-Toh et al., 2005). When one gene is responsible for a genetic defect that gene can be identified. I shall return to the implications of these advances in Chapter 6, but a word of warning is required here. If genes interact with each other or with the environmental conditions in which the animal is kept, then the benefits of DNA analysis to the breeder will be much less.

3.8 Heritability is a concept used by geneticists and can be thought of as the extent to which, for any given character, offspring resemble their parents. Heritability is important in selective breeding programs because traits with low heritability are much less responsive to selection. In population genetics high heritability means that the additive variation due to the genes is high. In this narrow sense, the measure is indicative of the extent to which the variation in the population is due to variation in genes considered independently of their interactions with other genes at the same or at different loci. More broadly, heritability refers to the ratio of the spectrum of differences in a characteristic due to genetic variation to the total spectrum of the phenotypic trait in the population. A trait has high broad sense heritability in a population to the extent that the existing variation for that trait in the population is due to genetic variation. None of these definitions refers to the characteristics of an individual since they all relate to traits found in populations of individuals.

3.9 If statistical variance in a trait is entirely due to variability in the genes, broad sense heritability is 1.0; if it is entirely due to the influence of the environment, broad sense heritability is 0.0. Behind the deceptively plausible ratios lurk some fundamental problems. For a start, the heritability of any given characteristic is not a fixed and absolute quantity. Its value depends on a number of factors, such as the particular population of individuals that has been sampled. For instance, if weights were measured only among well-fed dogs, then the total variation in weight would be much smaller than if the sample also included dogs that were small because they had been undernourished. The heritability of weight will consequently be larger in a population of exclusively well-nourished dogs than it would be among dogs drawn from a wider range of environments. Thus, the heritability of weight is likely to be lower in, say, purebred Labradors, where most of the genes influencing weight are similar, compared with a more heterogeneous population where, say, Labradors and Fox Terriers are allowed to interbreed.

3.10 The most serious weakness with heritability estimates is that they rest on the assumption that genetic and environmental influences are independent of one another and do not interact. The calculation of heritability assumes that the genetic and environmental contributions can simply be added together to obtain the total variation. In many cases this assumption is clearly wrong and an overall estimate of heritability has no meaning, because the effects of the genes and the environment do not simply add together to produce the combined result. This has important implications for the advice that should be given to breeders.

3.11 Estimated breeding values (EBVs) describe the relative genetic value of each member in a breeding population. They can also be used as a basis for choosing which animals are the best candidates to select for breeding to produce the next generation of offspring. Livestock and plant breeders have used estimated breeding value techniques for years to obtain genetic improvement in their breeding lines. The values are usually applied to a single characteristic of the animal

or plant and are derived from heritability estimates. Therefore, they are subject to some of the concerns that I have raised in the previous paragraphs. However, they may be of some help to the breeder in choosing a suitable mate particularly when attempts are being made to eradicate a serious inherited disease.

3.12 A desirable characteristic that is highly amenable to artificial selection can lie close (on a chromosome) to another gene that has much less desirable characteristics. The process of selection can, therefore, have entirely unintended consequences due to what is known as linkage. This may be rare but its possibility has implications to which the breeder should be sensitive when attempting to shape the characteristics of a line of dogs.

3.13 Professional geneticists have produced simple rules for calculating what would be likely to happen if two related individuals were mated. The chances that two half siblings, having only one parent in common, will inherit the exact same copy of any given gene from their common parent is a quarter. This is because, when parents create sperm or eggs for reproduction they halve the number of genes, with only one gene in each pair being present in the gamete. The halving process is assumed to be random so that when the relationship to the half-sibling is calculated, the metaphorical coin has been tossed twice as it were, and the link between the two individuals is obtained through the path from one to the common parent and back to the other. (Technically this is expressed as $1/2^n$ where n is the number of steps in the path or paths linking two individuals.)

3.14 When the same method is applied to full siblings, the links are through both parents so the chances of their sharing the same rare gene is a quarter plus a quarter, namely a half. This number is called the coefficient of relationship. When, as commonly is the case in dog breeding, the same sire is used many times, a dog may be the grandfather and even the great-grandfather of its potential mate. The same counting method can be used as before. The number of steps from the female to her grandfather is two and the number of steps to her great-grandfather is three. So the coefficient of relationship is $1/2^2+1/2^3$ which equals 0.375. Obviously, if manifold links exist in the pedigrees of the two dogs, the coefficient of relationship between two individuals will be higher than simply looking at the closest relations of the potential mates.

3.15 A further consequence of using the same sire for many matings is that the level of inbreeding is greatly increased. The phrase that is commonly used is effective population size, which means the population is equivalent in size to an idealized population in which a level of inbreeding is the same as that actually observed. Calboli et al. (2008) have calculated the effective population size for ten breeds of dog, exploiting one of the world's most extensive resources for canine population-genetics studies: the UK Kennel Club registration database. They analysed the pedigrees up to around eight generations before the present and found extremely inbred dogs in each breed except the greyhound. They estimated an effective population size between 40 and 80 for all but two breeds. These low numbers were obtained in breeds where the actual population sizes were often in the thousands.

3.16 The random way in which genes are reduced from pairs to singletons in the formation of sperm or eggs has a consequence that is particularly important in inbred populations. Purely by chance certain genes may be lost. This occurs much more quickly in small populations. The process is known as genetic drift. Once genes have been eliminated they cannot be recovered except by outcrossing or by very rare mutations. This means that, when the effective population size has been drastically reduced (bottlenecked) by selective breeding or, under natural conditions, by an environmental catastrophe, regrowth of the population will be strongly affected by what are known as founder effects. The genetic structure will inevitably be constrained by what was left at the time of the bottleneck.

3.17 Despite severe bottlenecks, small populations can survive. A famous case is provided by the white Chillingham cattle kept in a Northumberland park. The claim is that these cattle have been kept in an isolated state for seven centuries. Whether or not that is correct, the herd was reduced to 13 in the severe winter of 1946-47. Since then it has re-grown to more than 80 animals. Another famous example is Przewalski's horse which became extinct in the wild but was then re-grown from nine individuals to more than 1500, admittedly after some crossing with domesticated horses, and has been successfully reintroduced into the wild. Zoos are continuously faced with breeding from tiny numbers and whole populations may have a single pair of individuals as common ancestors.

3.18 Purging of alleles with seriously damaging effects can carry obvious benefits. In the process of inbreeding, other alleles with less serious effects can become homozygous and can be retained in the

population. Outcrossing to introduce fresh blood can mitigate such effects by introducing greater variability into the gene pool, but outcrossing does carry the danger that the benefits of purging are undone by introducing new deleterious recessives.

3.19 While inbreeding is generally seen as being undesirable, the debate has become much more nuanced in recent years. By no means all inherited diseases are carried by single pairs of genes. Many inherited diseases arise from the interaction of the products of several genes. If one or more of these genes contributing to the inherited disease are eliminated by genetic drift or by skillful breeding, then the disease may no longer be seen in the offspring.

3.20 Excessive outbreeding can also carry costs and in many species adaptations to local conditions or complexes of genes that work well together can be broken up by outcrossing. I discussed the issue of optimal outbreeding more than a quarter century ago (Bateson, 1983) and a growing body of data from fish (Kalbe et al., 2009) to humans (Helgason et al., 2008) supports that view. Whether or not this is true for any breed of dog has yet to be established. In many human cultures first cousin marriages are commonplace. Relationship in such a marriage is 0.125 and the ill-effects are generally small, although much debated (Bittles, 2008). However, when repeated generation after generation, previously unsuspected ill-effects of inbreeding can emerge. Compared with a first cousin mating, the genetic risk associated with a grandfather-granddaughter mating, often used in pedigree dogs, is doubled, and where cumulative inbreeding has occurred (paragraph 3.14) the genetic risks increase proportionately.

Chapter 4 – Responses to the Call for Evidence

A call for evidence received responses from breed clubs, breeders, veterinary surgeons, other scientists or academic institutions, dog or animal welfare charities, and pet owners. Widespread concern was expressed about dogs that are farmed and bred for profit, sometimes on a large scale. The need for statistically significant and robust prevalence data of inherited disorders was listed as the key research need by everyone who addressed the topic. The balance of opinion was strongly in favour of action to resolve the worst abuses of current breeding practices, provided both that controls or standards apply equally to all dogs and that the details of strategies are breed or cross-breed specific.

4.1 The invitation to submit evidence to the Inquiry went out on 12 February 2009 with a deadline for responses of 15 May 2009. 135 responses were received before or shortly after the deadline including:

a. 58 from breed clubs.
b. 21 from breeders.
c. 16 from veterinary surgeons, other scientists or academic institutions, including the Royal Veterinary College and the veterinary schools of the Universities of Bristol and Cambridge.
d. 13 from dog or animal welfare charities.
e. 10 from individuals who identified themselves as pet owners.

4.2 In some cases the respondents did not identify their affiliation and their reason for submitting evidence was not obvious from the text. The charities and private societies that responded included: Advocates for Animals, the Blue Cross, Canine Concern (Scotland) The Companion Animal Welfare Council, Dogs Trust, Guide Dogs for the Blind, the Kennel Club, the Scottish Kennel Club, the PDSA, the RSPCA, and a number of breed-specific dog rescue/re-homing charities

4.3 I am very grateful to all who took the time and trouble to submit their evidence. I am also aware that a few respondents struggled with or were suspicious of the format of the invitation. I should therefore like to make two points clear:

a. I believe strongly that decisions, particularly any which might involve legislation and/or increased costs or obligations for affected individuals, should be based on the best available evidence. The invitation was therefore deliberately focussed on identifying both what evidence was available and what further evidence might be required.
b. The terms of reference for the Inquiry and hence the invitation to submit evidence explicitly included all issues relating to the breeding of dogs. It was, however, evident from a few responses that some terms were open to interpretation in a number of different ways and that in some instances the differing interpretations had fed concerns about impartiality. For the avoidance of further confusion therefore, throughout the Inquiry and for the purposes of this Report, the following terms have the meaning set out below.

Dog farm Any establishment breeding dogs which, by virtue of the numbers of bitches/ litters involved, falls under the licensing provisions of the Breeding of Dogs Act.
Pedigree dog A pure-bred dog of a specified breed which has been registered with the Kennel Club or equivalent and has a pedigree record with details of its breeding over a minimum number of generations.
Pure-bred dog A dog resulting from the crossing of two pure-bred dogs of the same breed, but which is not registered with the KC or equivalent as a pedigree dog.
Cross-bred dog The result of a deliberate or accidental cross between two dogs of different breeds (ie a first cross – F1 hybrid)
Mixed breed dog A dog which has been bred from dogs of uncertain or cross-bred parentage.

Issues raised

4.4 The issues raised by respondents to the Inquiry fell into five main categories:

a. Concern about the nature of the Inquiry and/or the nature of the questions posed.
b. The farming of dogs.
c. Temperament and behaviour.

d. Inherited disease.
e. Selection for exaggerated characteristics.

These issues are dealt with in turn below.

Concerns about the Inquiry

4.5 Respondents who asked questions or complained about the nature of the Inquiry made the following points:

a. Some felt that the nature of the questions implied that judgment had already been given against pedigree dog breeders and warned against what they saw as the pillorying of bona fide and well-meaning breeders, believing that the far more serious issues raised by large scale commercial dog breeding were ignored.
b. Some struggled with the more technical questions and a high proportion of these pointed out, with some justification, that much of the scientific evidence sought was simply not available.
c. Some opted to respond in the context of the terms of reference of the Inquiry rather than the call for evidence.

Dog breeding farms

4.6 A high proportion of respondents from all backgrounds expressed concern about the welfare implications of large-scale commercial breeding of dogs. In many instances pedigree breeders maintained that this was either the highest priority, or the only welfare concern that merited attention. The concerns expressed included:

a. Poor hygiene, attention to health and management of pregnant bitches.
b. Poor socialisation of both bitches and puppies, failure to meet both the bitches' and the puppies' needs for stimulation, play and exercise.
c. Frequently repeated breeding of the bitches to the detriment of both their health and the health of the litters, ie two litters in one year and/or breeding of bitches too young and/or too old.
d. Negligent breeding of dogs with heritable health and/or conformation problems, including no health testing of parents prior to breeding and/or ignoring the results of health tests or veterinary advice.
e. Inbreeding as a financially rewarding convenience, including over-use of stud males both generally and on related females.
f. Negligence with regard to selection of, or checks on the suitability of, purchasers.
g. Lack of guidance and information for purchasers
h. Failure to carry out appropriate vaccination and other health programmes.
i. Failure to accept any liability for subsequent health or behaviour problems with puppies.
j. Failure to supply promised registration certification and general lack of traceability of breeder.

4.7 Some respondents drew attention to the fact that dog breeding establishments within Great Britain were not the only problem and expressed the view that the import of puppies from Ireland should be stopped if it were possible to do so.

4.8 Attention was drawn to the poor health and behavioural status of bitches rehomed from dog breeding farms.

4.9 A view frequently expressed was that these abuses arose because of the economic driver; in other words that dog farmers regarded dogs as tradeable commodities. It was argued that they were motivated entirely by the desire for profit and therefore not only had no concern for the dogs but also were tempted to cut corners, resulting in gross and intentional abuses such as those listed above.

4.10. It was also noted that some abuses arose as a result of ignorance; and that these were at least as likely to occur with a small or hobby breeder as on a commercial establishment.

4.11 Many respondents were of the view that the current legislation, as it is framed and/or enforced, failed to prevent these abuses. It was also noted that purchase power (as currently exercised) and consumer protection legislation was also ineffective in this area, because people did not return a substandard puppy to the breeder as they would other goods that were not fit for purpose.

4.12 Finally, many respondents argued that problems arising from inbreeding or the poor selection of parents with regard to health, conformation or behavioural characteristics (as set out in paras 4.14 – 4.16 below) were at least as likely to be perpetuated by the dog breeding establishments producing non-pedigree dogs as by breeders producing pedigree dogs. Some respondents argued it was more likely.

Temperament and behaviour

4.13. A small number of submissions made a

forceful argument for the need to address welfare problems arising from a failure to select for a temperament appropriate for the ecological niche (ie family pet) which most dogs must occupy. The following key points were made:

a. Behavioural problems were a primary reason for premature death in pet dogs.
b. Both pedigree and non-pedigree dogs were affected.
c. Behaviour was affected by the inherited characteristics of the dog, the way in which it was reared, and its current environment.
d. The behavioural testing of adult dogs could be effective in removing deleterious traits from the breeding pool.
e. Effective socialisation of a puppy is most readily achieved within the first 8 weeks of life. Ideally this should therefore be done by the breeder before sale of a puppy. It was difficult to make up lost ground effectively after that time.

Inherited health problems

4.14 A large number of submissions related to welfare problems arising from inherited defects. The issue was complicated by the fact that a broad spectrum of issues could be covered under this heading including:

a. The increasing occurrence of disease or malformations as a result of breeding within a limited gene pool (see Paragraph 4.15).
b. The development of deleterious changes in conformation or other features as result of the deliberate selection for extreme morphological characteristics (see Paragraph 4.16).

4.15. A high proportion of responses from breeders and breed societies drew attention to the efforts already underway to address specific health problems in specific breeds – many of them involving the Animal Health Trust, jointly or part-funded by the Kennel Club and individual breed societies. Points made with regard to these activities included:

a. Funding of this work had largely been by pedigree breeders themselves or by charities.
b. A long list of heritable diseases affected dogs, but little or no hard data were available on prevalence. A few respondents pointed to the need for a system to collect data from veterinary surgeries, as being developed by the Royal Veterinary College.
c. Case studies of the effective elimination of heritable problems were few. One example commonly quoted related to the eradication of canine leucocyte adhesion deficiency (CLAD) in Irish Setters.
d. While some committed and reputable breeders did undertake expensive tests and apply the results to their breeding strategies many, even in the pedigree world, did not. It was assumed that the likelihood of dog farmers undertaking such tests was even less.
e. Currently no effective means existed for requiring breeders to undertake tests or to act on the results; and/or to monitor compliance. Even the Kennel Club Accredited Breeder Scheme did not require that the results of tests were appropriately applied to breeding decisions.
f. Simplistic avoidance of breeding from animals scoring positive for particular disorders at test was not the solution. That would be likely to make already small gene pools even smaller, and result in worsening the problem or creating new ones.
g. The most popular recommended solution (from submissions which recognised the problem) was to develop breeding strategies specific to individual breeds, based on the best available genetic advice and supported by such tools as Estimated Breeding Values, in order to reduce the occurrence of high priority problems over time.
h. In some breeds, changing the focus from specific attributes of form (e.g. size/shape/location of spots in Dalmatians) would assist in reducing the problem.
i. Outcrossing had also been shown to be an effective means of breeding away from problems both recently and in the past; but whereas almost every respondent (with one exception) stated that breed purity should under no circumstances take precedence over welfare, this solution had little support amongst current breed societies. The willingness of the Kennel Club to recognise the results of cross breeding within the breed registries was disputed. One respondent argued that, regardless of parentage, any animal that met the breed standard should be register-able.
j. Many respondents had strong views about inbreeding. A number, particularly geneticists and veterinary surgeons, pointed out that inbreeding was intrinsically high risk. The closer the relationship between breeding partners, the greater the likelihood of the expression of deleterious qualities. A high level of support generally was given for the Kennel Club's ban on first degree breeding; e.g. parent to offspring, siblings to each other. However, a proportion of breeders argued vigorously in favour of what they termed line-breeding; ie the breeding of close relatives (outside the first degree) often used

to maximise the impact of a valued stud male. They maintained that this enabled them to fix positive qualities in the line. Others argued that they overlooked or under-valued the risk of fixing deleterious recessive traits in the genotype.

k. A very large volume of material was supplied with respect to syringomyelia and Mitral Valve Disease (MVD) in Cavalier King Charles Spaniels (CKCS). Substantial submissions were also made with regard to Dalmatians.

Selection for exaggerated characteristics

4.16 Many respondents referred to problems arising from the selection for extreme traits. Some argued that these problems are so prevalent that both dog owners and the veterinary profession have become desensitised to the difficulties suffered by these dogs. This was also referred to as selecting for fashions in form, to the neglect of selecting for characteristics beneficial to the dog. With few exceptions, most breeders who acknowledged this issue pointed to problems in breeds other than their own. Key points included:

a. The most commonly mentioned breeds in this category were the British Bulldog and other short muzzle dogs such as the Pekingese; the German Shepherd Dog (the Germanic type with the so-called "banana" backs); dogs with heavily folded skin (e.g. Shar-Pei) and exceptionally large and/or heavy breeds such as the St Bernard.
b. Many referred to the adjustment in breed standa ds recently introduced by the Kennel Club and the revised training for judges. One respondent drew attention to the clear guidance for judges on what to look out for and what is acceptable, or not, provided by the Swedish Kennel Club.
c. An interesting portfolio of portraits of dogs over the last 100 years was provided by one respondent, illustrating the major changes over time in muzzle length, weight, size and coat length in a number of breeds.
d. The representative of the International Sheep Dog Society made a powerful case for the importance of the use for which the ancestors of the breed had originally been selected, and stated that "breeding decisions….are taken to produce healthy dogs that are fit, have stamina and intelligence."
e. A number of respondents argued that what had chnged as a result of artificial selection pressure could be reversed, over time, by the same means; provided, of course, that the breeders and breed clubs were willing to change their selection criteria.

Views on potential solutions

4.17 Question 10 of the invitation to submit evidence sought views on a number of potential actions which had already been mooted prior to the launch of the Inquiry. Not all respondents completed this section,

4.18 Views about potential solutions varied enormously; from those who considered that anything that was necessary to be done was already in hand by the Kennel Club, to those who considered that the current situation was nothing short of an unmitigated disaster for dog welfare and justified radical changes in the law and supporting enforcement measures. Other actions proposed as contributing towards solutions included:

a. Creation of an offence of negligently or carelessly breeding dogs in such a way as to harm the parents or offspring (cf a comparable offence in livestock legislation).
b. Creation of liability amongst dog breeders for losses or costs incurred by purchasers as a result of failures to take all reasonable precautions to test for specified diseases or problems.
c. Creation of an independent Dogs Council to oversee a range of issues including breed specific breeding strategies, definition of required health tests, breed standards, etc..
d. Creation of an obligation on the part of a breeder to identify indelibly every puppy before sale. Opinion differed about the best method for identifying a dog (microchipping, tattooing and DNA profiling); but strong support was expressed for applying the identification requirement and method to all dogs not just pedigree dogs.
e. Creation of a standard puppy buyers contract, and/or charter.
f. Action to replace the Sales of Dogs Acts with new regulations under the Animal Welfare Act, clarifying definitions, making the legislation easier to enforce, providing powers to issue improvement notices etc.
g. A "breeding of dogs" quality assurance scheme or process which could provide confidence to the purchaser that all appropriate care had been taken to produce a fit and healthy puppy. In this context the Kennel Club Accredited Breeder Scheme (ABS) was recognised by some as a useful step in the right direction; but it was criticised by many for failing to deliver key elements of improved welfare such as rigorous pre-accreditation inspection and requirements to observe the

results of health tests. A number of respondents also pointed out that although the general public assumes that registration of a dog has meaning in terms of quality and welfare; in reality the registration requirements impose no relevant conditions. Opinion was divided on whether the ABS should be revamped or replaced. Some respondents supported the concept of competing schemes, provided all demonstrated (e.g. via the United Kingdom Accreditation Service) that they delivered an equivalent and appropriate level of assurance.

4.19. Some respondents expressed fears that overly costly or bureaucratic schemes would impose disproportionately heavy burdens on breeders, particularly smaller breeders. Some were also worried that changes designed to resolve problems in one area might create others, particularly if change was not evidence based. In this context, many referred to the current lack of hard evidence, particularly as regards prevalence.

4.20. The balance of opinion, however, was strongly in favour of action to resolve the worst abuses of current practices, provided both that controls or standards apply equally to all dogs (not just pedigree or pure-breeds) and that the details of strategies can be breed or cross-breed specific.

Chapter 5 – Digest of the Inquiry Interviews

Politicians, civil and public servants, scientists, veterinary surgeons, dog breeders, and representatives of animal care charities were interviewed. The subjects of the interviews covered existing academic research and the challenges that needed addressing in terms of prevalence of disorders and corrective surgery. Views on the current welfare problems and potential solutions to them were obtained from breeders and breeder organisations, pet nutrition and marketing businesses, and dog rescue and re-homing charities. Advice was also given on legal and enforcement challenges.

5.1 Following analysis of the written submissions and the meeting of the Advisory Group on 1 June, I undertook with Heather Peck a series of interviews to explore specific issues in greater depth with individual respondents. I am grateful to all those concerned for the time and effort they devoted both to the interviews and to dealing with follow-up questions. A list of those interviewed is given below with their affiliation and/or interest.

Asher, Lucy; Burn, Charlotte; Collins Lisa; Pfeiffer, Dirk, and Summers, Jennifer (Royal Veterinary College)
Baldwin, Clarissa and Laurence, Chris (Dogs Trust)
Bloomfield, Lesley and Scott, Louise (English Springer Spaniel health coordinators)
Blott, Sarah (Animal Health Trust)
Bowles David; Calder, Claire; and Evans, Mark (RSPCA)
Cantelo, Gemma and Martin, Wendy (LACORS)
Cavill, David; Nunn, Janet; and France, Meriel (Petcare Trust)
Casey, Rachel (University of Bristol, animal behaviour specialis)t
Creffield, Jocelyn (Dog breeder)
Fitzpatrick, Jim (MP, Minister of State, Defra)
Fowler, Carole (Cavalie r King Charles Spaniel health campaigner)
Gibbens, Nigel (Chief Veterinary Officer)
Glossop, Christianne; Streeter, Alun and Eckford, Les (CVO Wales and officials)
Harrison; Jemima (Broadcaster)
Hoppe, Henry; Pritchard, David; Garcia, Rebeca; Kenner, Rebecca (Defra)
Irving, Ronnie; Kisko, Caroline; Lambert, Bill and Sampson, Jeff (Kennel Club)
Johnson, Tony (Dog breeder)
Kennedy, Jane (MP, then Minister of State, Defra)
Kirkwood, James (Companion Animal Welfare Council)
Lambert, Bill (Dog breeder)
Martlew, Eric (MP, Chairman of APGAW)
McCune, Sandra & Jones, Paul (Pedigree Petfoods)
McGreevy, Paul University of Sydney, veterinary researcher)
Ollier, Bill (University of Manchester, geneticist)
Paull, Nicky; Hall, Ed & Wain, Rachel (British Veterinary Association)
Radford, Mike (University of Aberdeen, expert on animal welfare law)
Rooney, Nicola (University of Bristol, co-author RSPCA report)
Rusbridge, Clare (Veterinary neurologist)
Sargan, David (University of Cambridge, co-author RSPCA report)

In addition:

a. The Associate Parliamentary Group on Animal Welfare (APGAW) kindly permitted the Inquiry Administrator to attend their interviews as an observer.
b. Visits were made to four dog shows and an anonymous visit made to a major puppy supermarket.

5.2 The subjects covered by the interviews broadly fell into three categories as follows:

a. Updates on relevant academic research and the research challenges being addressed.
b. Views on the current welfare problems and potential solutions, from those representative of specific elements of the dog breeding and animal welfare sectors (e.g. breeders and breeder organisations, pet marketing and sales, pet nutrition, dog rescue and re-homing charities).
c. Advice on legal and enforcement challenges.

These subjects are dealt with in turn below.

Research

5.3 Three key research issues were mentioned in almost every interview. The points discussed are summarised briefly below.

Prevalence data

5.4 The need for statistically significant and robust prevalence data was listed as the key research need by everyone who addressed the topic. Work in hand included the development of systems to collect prevalence data from veterinary surgeries and key veterinary hospitals. Several elements to this work were discussed including the development of:

a. Unified coding procedures.
b. Information Technology "patches" that would enable collection from several different veterinary practice databases.
c. Encouraging sign-up from commercial practices.

Each of these steps had posed significant challenges and even assuming that the coding and technical questions could be resolved, the costs connected with entering data in the appropriate manner at the veterinary practice level meant that it was difficult to persuade veterinary surgeries to sign-up to the process.

The identification of gene sequences and development of genetic tests

5.5 The ability to detect deleterious traits in dogs prior to mating was widely seen as a vital tool to assist breeders in breeding away from specific disorders. It was recognised that genetic tests were currently available for only a small number of disorder/breed associations. It was not yet possible to say what proportion of the disorders seen in various populations of dogs were due to single genes and what proportion were polygenic, although the probability was that the major challenges (such as cancers, musculoskeletal disorders and neuropathology) were all complex; while in general each breed also had one or two simple autosomal recessive disorders. However, recent advancements in technologies combined with the fact that many dogs were from highly inbred populations, meant that only small sample numbers were necessary to identify genetic associations through single-nucleotide polymorphism arrays. The potential was for an explosion of new knowledge and new tests in the near future.

5.6 The key question, then, was how to provide accessible and straightforward guidance to breeders to assist them in making sire and dam selections that effectively breed away from high priority problems without worsening inbreeding or introducing new problems. In this context I was informed about work to develop web-based decision support tools using, amongst other techniques, Estimated Breeding Values.

5.7 It was clearly recognised that breeding solutions needed to be breed specific. The success of some breed societies in identifying and effectively breeding away from specific problems and the key role played by informed and active breed health representatives was noted (e.g. Copper deficiency in Bedlington terriers and canine leucocyte adhesion deficiency (CLAD) in Irish Setters). It was also pointed out on several occasions that strategies to breed away from problems were only successful if the breeders both recognised the problem and were committed to addressing it. Where the welfare problem is caused by a defining characteristic of the breed, such as headshape in brachycephalic breeds, the breeders' reluctance to admit the difficulty was a stumbling block.

Priorities for research, and the challenges of obtaining research funding

5.8 Considerable agreement across the board existed with respect to the top priorities for research. These were identified as:

a. Robust data on the prevalence of specific conditions, by breed.
b. Identification of the gene sequences involved in high priority simple and polygenic disorders, together with the development of affordable genetic tests and, in the case of complex disorders, the exploration of how the genotype and the environment (e.g. factors such as infection, age, hormone levels, diet and pollution) affect gene expression.

5.9 The funding provided by organisations such as the Kennel Club, Dogs Trust, UFAW, and RSPCA, by breed societies and from the pet food industry, was noted with gratitude. However, attention was also drawn to the fact that in many cases such funding came as relatively small sums over short time-scales and therefore while adequate to support a PhD student, was not adequate to support a post-doctoral fellow or a team of trained professionals. Many felt that other potential sources of funding such as the Wellcome Trust and the BBSRC did not accord work in this area the appropriate priority, even though the latter had listed animal welfare as a key priority. In particular, it was felt that comparative genomic research

using the dog as a model for human genetic diseases had considerable value. Nevertheless, research proposals in this area were ill-served by current selection procedures that tended to focus either on medical or veterinary research; and proposals that crossed the boundary between the two were at a disadvantage – a not uncommon problem in inter-disciplinary research.

Other research issues

5.10 Other areas which were covered in some depth in specific interviews included:

a. The causes, heritability, genetic factors, prevalence and welfare impact of syringomyelia.
b. The prevalence, welfare effects and impact of screening programmes on eye disorders in various breeds.
c. Effective socialisation of puppies and temperament tests.
d. The difficulties caused by the way in which current controls over experimentation on animals are operated through the Animals (Scientific Procedures) Act 1986, with particular reference to the barriers placed in the way of collecting material for DNA databases. Taking blood samples from dogs for surveillance is prohibited by the Animals (Scientific Procedures) Act unless it is part of a clinical procedure.
e. The relationship between pedigrees and show winners. In some analyses inbred dogs did less well in shows than the offspring of parents that were not closely related.

Problems and potential solutions

5.11 The problems most commonly identified and discussed in the interviews included the following:

a. Welfare issues common to all dogs regardless of breed, such as poor management, health, and hygiene on large commercial dog farms.
b. Welfare issues specific to dogs of individual breeds (whether pure-bred or registered pedigree) such as the inheritance of disease or selection for extreme characteristics.
c. The very small effective population sizes in some breeds of dogs.
d. The difficulties of communicating effectively with large numbers of breeders, given that communication from the Kennel Club through breed societies can be a long and inefficient process heavily dependent on the goodwill of individuals; and that many breeders do not belong to a breed club.
e. The inadequate and patchy enforcement of the Breeding of Dogs Acts and the Animal Welfare Act.
f. The lack of any means of requiring all breeders to apply higher standards to dog breeding activities.
g. The limitations of the existing Accredited Breeder Scheme regarding the delivery of robust quality assurance with respect to the welfare of all the dogs involved and the health and welfare of the puppies.
h. The purported declining level of "animal sense" in the human population as a whole, and the lamentable lack of general understanding of the issues that should be considered before buying a dog.
i. Rigidity of attitudes on the part of some breeders and/or some breed societies regarding where and how the boundary is drawn around a specific breed, resulting in the hypothetical "purity" of the breed being accorded higher priority than the welfare of the dogs.
j. The multiplicity of organisations with an interest in some aspect of dog welfare and their failure to work together cooperatively to achieve common aims; together with the lack of an over-arching independent body capable of providing and being seen to provide objective advice and guidance.
k. The recent development of "puppy supermarkets" and the concomitant treatment of dogs as commodities. This way of selling puppies encourages impulse buying without purchasers having proper guidance or gaining access to the mothers of the puppies.
l. The uncomfortable reality that a reputable breeder does not sell to some would-be purchasers and that these form a customer base for the dog farmers.

5.12 Solutions that found considerable favour with a majority of interviewees included:

a. A proposal to require puppies to be microchipped before sale.
b. Proposals to upgrade the Accredited Breeder Scheme to include more rigorous inspection requirements, requirements regarding compliance with breed specific breeding strategies and provision of greater, breed-specific guidance on how to comply with a dog breeding code and legislation.
c. The creation of an independent over-arching body to provide advice and guidance on the welfare aspects of the breeding of dogs.
d. The creation of a standard puppy contract.
e. The need for breed-specific advice and guidance on how to breed away from particular problems.

Legal and enforcement challenges

5.13 Opinion was divided on whether legislation required amendment and if so, how. One commonly held view was that the legislation was adequate in itself, but was inadequately applied and enforced. The alternative view was that additional controls were necessary to address specific abuses. These controls might consist of new regulations under existing legislation and/or a statutory code of practice.

5.14 Proposals included new regulations under the Animal Welfare Act 2006 (for England and Wales) or the Animal Health and Welfare (Scotland) Act 2006 that do any or all of the following:

a. Promote in England and Wales or secure in Scotland the prohibition of the intentional breeding from dogs that are known to carry hereditary diseases.
b. Clarify licensing requirements for commercial breeders to make the conditions easier to enforce.
c. Enable the development of the risk-based enforcement of licensing.
d. Create a new offence or a new obligation which extends the duty of care to apply to the health and welfare of the parents and offspring of a mating.
e. Create a liability on the part of breeders for costs which arise for purchasers as a result of negligence with regard to health testing.
f. Create a legal obligation to identify dogs either by microchipping or tattooing.
g. Require the registration of all breeders of dogs.

5.15 A statutory code of practice on the breeding of dogs was proposed setting out in greater detail:

a. What is good practice with regard to the welfare of dogs used for breeding and theoffspring.
b. What is good practice as regards the production of puppies that have a good chance of living healthy lives and which are suited to the pet environment.

The code would need to provide guidance for breeders and make enforcement easier for the local authorities.

Chapter 6 - The Welfare Costs of Dog Breeding

Current dog breeding practices do in many cases impose welfare costs on individual dogs from a variety of causes including the following: negligent or incompetent management with a particular impact on breeding bitches; use of closely related breeding pairs such that already high levels of inbreeding are worsened; use of breeding pairs carrying inherited disorders such that inherited disease is transmitted to offspring; artificial selection for extreme characteristics that are directly responsible for failure to meet one or more welfare criteria; and the sale of dogs that are unsuited to the conditions in which they will be kept by their owners.

6.1 In my terms of reference I was asked to consider whether the health and the welfare of dogs are affected by current breeding practices. As a preliminary to answering that question I considered in Chapter 2 the issues that have been taken into account in making assessments of sentience and animal welfare. Evidence needs to be collected in an orderly fashion and set against a broad range of criteria including: assessments of physical damage to the animal and the extent to which it has been required chronically to operate homeostatic mechanisms that would normally operate acutely, measurements of physiological states that would be found in suffering humans; the animal's preferences; and considerations of the ecological conditions to which the animal is adapted, its normal social structure and life-history requirements. Much more is known about farm animals and animals typically kept in laboratories than is known about dogs.

6.2 I accept, of course, that the elimination of pain, distress, lasting harm and other forms of suffering is at the fore-front of public concern about animal welfare. Moreover, the Animal Welfare Act 2006 (section 9) and the Animal Health and Welfare (Scotland) Act 2006 recognise the importance of meeting the needs of the animal for which humans have responsibility including a suitable living environment, a suitable diet and the opportunity to exhibit normal behaviour patterns. The impact of current dog breeding practices can therefore be said to impose welfare costs when one or more of the welfare criteria set out in the Acts are not met.

6.3 From the evidence presented to me, I have no doubt that current dog breeding practices do in many cases impose welfare costs on individual dogs from a variety of causes including:

a. Negligent or incompetent management with particular impact on breeding bitches.
b. Use of closely related breeding pairs, such that inherited disease is transmitted to offspring.
c. Breeding from dogs of any breed or cross-breed that are known to carry an inherited disease.
d. Artificial selection for extreme characteristics that are directly responsible for failure to meet one or more of the welfare criteria.
e. Sale of dogs that are unsuited to the conditions in which they will be kept by their owners.

Dogs as commodities

6.4 The Inquiry received a large number of submissions asserting that the major welfare issue facing dogs arose in commercial breeding establishments handling large numbers of bitches and litters. These were often characterised as "puppy farms". The problems described included:

a. Poor hygiene and health standards.
b. Poor care of bitches, little socialisation and exercise, too many litters per bitch and/or bitches being bred too many times each year, bitches being bred too old and/or too young.
c. Poor care of litters, puppies not vaccinated, puppies not socialised either with humans or other dogs, puppies sold too young.
d. Careless or negligent selection of parents, such that problems relating to inbreeding and/or inherited disease are exacerbated.

6.5 The extent of the trade in dogs is astonishing. One member of my Advisory group visited a dog breeding establishment in the Republic of Ireland where 5000 dogs are bred per year in this one establishment. Many other dog farms exist in the Republic. The great majority of the puppies are sold in Southern England.

6.6 Within the UK, a concentration of dog farming is found in Wales and as at 31 March 2009, 977 dog breeding establishments were known to the authori-

ties. Of these 533 were exempt from licensing because they were too small (breeding less than five litters a year), 195 were licensed, and 249 were unlicensed and undergoing investigation. Since 31 March 2009, the local authorities of Ceredigion and Carmarthenshire have focused significant effort on dog breeding issues. At a recent animal welfare conference run by the Welsh Assembly Government, these authorities commented that in Ceredigion and Carmarthenshire alone, some 844 premises are currently exempt from licensing under current legislation.

6.7 From the evidence presented to the Inquiry, it would seem that Local Authorities experience some difficulty in enforcing existing welfare legislation. Apart from the obvious problem of lack of resource, the degree of judgment that has to be exercised by inspectors (normally Environmental Health Officers) relating to the provision of appropriate exercise and socialisation regimes requires a degree of veterinary and welfare expertise not always available to the inspectors.

6.8 The need to socialise dogs early in life was established by the work of Scott & Marston (1950) and was reviewed more recently by Serpell & Jagoe (1995). Dogs that are not well socialised to humans will rarely make good pets later in their lives. A criticism often directed at the dog farms is that their puppies are not socialised. However, these puppies are usually sold from 6 to 8 weeks after birth and are well able to form strong attachments to their new owners. A more serious criticism of this type of dog dealing is that the puppies, taken away prematurely from their mothers, are often isolated from other dogs during what may be a prolonged process of being sold. Isolation is sometimes justified on the spurious grounds that the puppies were too young to be vaccinated and therefore were kept away from other animals. The justification is invalid and the practice of treating puppies in this way is likely to cause much unnecessary suffering.

6.9 I accept that some of these dog breeding establishments may be well run, the dogs cared for properly and the buyers given full and helpful information about how to care for a puppy. Nevertheless, I agree with many of the respondents to my call for evidence (summarised in Chapter 4) and those people whom I interviewed (summarised in Chapter 5) that the welfare issues raised by many of the dog breeding establishments are serious. In addition to the obvious health and hygiene abuses already prohibited by the Breeding of Dogs Acts, my concerns include the following:

a. Keeping breeding bitches in cages without adequate opportunities for exercise, play or interaction with other dogs or humans.
b. Confining puppies alone prior to sale.

Excessive levels of inbreeding

6.10 Much evidence indicates that many dog breeds are formed from very small effective breeding populations (e.g. Calboli et al., 2008). This has arisen as a result of a number of factors including:

a. The small number of animals that founded the breed.
b. Small numbers of successful show dogs being used for breeding purposes.
c. The use of so-called line-breeding (ie the selective breeding of close relatives) in order to fix desired characteristics in the line.
d. Closed breed society stud books.

6.11 I have discussed the impact of inbreeding in some detail in Chapter 3. I acknowledge that inbreeding can have the beneficial effect of purging some damaging traits, and that in some cases "line-breeding" appears to have been employed to that end. I also acknowledge that a detailed knowledge of the health, longevity and other relevant characteristics of the animals in a dog's pedigree over several generations is valuable information when selecting a partner for mating. However, inbreeding also creates problems in that:

a. It tends to fix recessive deleterious traits and thereby increase the number of animals in which the disease is apparent.
b. Strong artificial selection of particular characteristics may sometimes result in the accidental selection for associated deleterious traits where the loci of both are close on the chromosome.
c. Inbreeding is positively correlated with both decreasing resistance to pathogens and increasing susceptibility to specific conditions such as diabetes mellitus.
d. Inbred dogs are less likely to be show winners.

6.12 On balance therefore, and even setting aside the welfare issues arising from the inheritance of specific disorders, I conclude that the existence of highly inbred populations poses a welfare burden in and of itself.

6.13 A much more serious welfare problem arises for the individual animal if, as the result of excessive inbreeding, it inherits a painful or damaging disorder. Sargan, (2004) produced a list of such disorders breed by breed. He runs a website which he updates and can

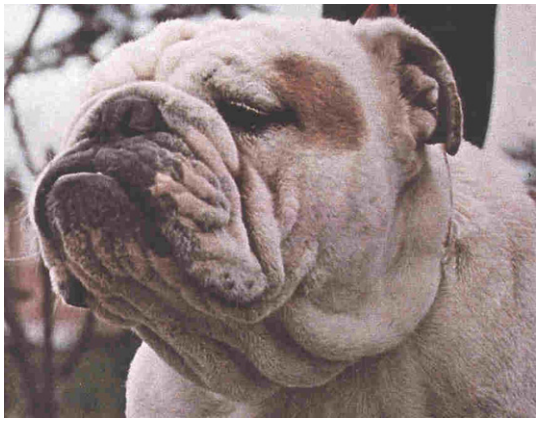
be consulted at <www.vet.cam.ac.uk/IDID>. In a report to the RSPCA Rooney & Sargan (2009) conducted a review of inherited diseases in dogs and a survey of potential future actions. Subsequently Sargan & Rooney (submitted) have produced a more scholarly version. Similarly, a group at the Royal Veterinary College have examined the disorders found in many breeds of dogs (e.g. Asher et al., 2009; Summers et al., in press). As all these authors would be the first to admit, statistically significant data on the prevalence of the inherited disorders is in short supply. It is rarely the case that a randomly sampled population of dogs is investigated to determine how frequently an inherited condition occurs within a particular breed.

6.14 A recent telephone survey conducted in Italy found that pedigree dogs were twice as likely to suffer from cancer as non-pedigree dogs (Vascellari et al., 2009). Hazel Bentall conducted for the Inquiry a review of the incidence of breed specific health problems in dogs as identified in peer-reviewed published literature since 1991 and evaluated the papers for sample size, relevance and robustness. She surveyed 1516 papers and found that most were based on single cases and gave little idea of prevalence. The best data come from sources in the United States and Sweden. The Banfield veterinary practice that has clinics all over the United States collects information systematically on the health condition of dogs. A large set of records are held in the US Veterinary Medical databases. The other useful source of data is produced by a Swedish Insurance company, Agria (see for example Egenvall et al. 2005, 2007). Information from the United States and Sweden may not necessarily be relevant to the United Kingdom because genetic differences between the same breed in different countries are well known. UK pet insurance companies must hold a considerable amount of relevant UK information that could be subjected to epidemiological analysis, but so far this has not been made available to me despite my asking.

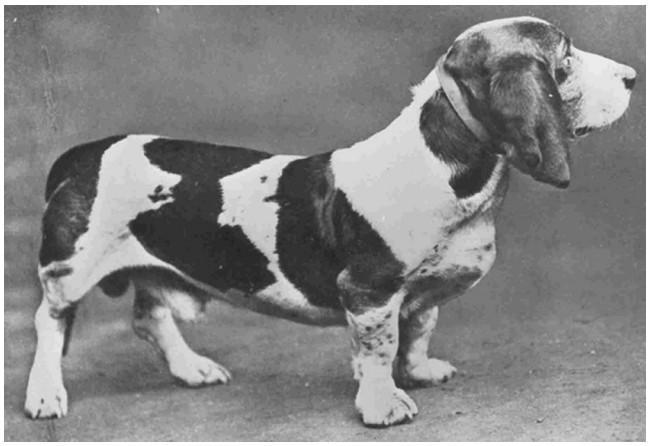
6.15 The list of disorders is often greatest in the most popular breeds, probably representing greater reporting frequency rather than intrinsic lack of good health. The research interest in diseases that provide a model for the same problems in humans means that these are also disproportionately represented in the literature. The same is true for the diseases of dogs popular for specific working environments, such as assistance dogs and police dogs. Largely lacking, however, are robust well-controlled studies on the prevalence of specific disorders in specific breeds. A difficulty in carrying out thorough epidemiological research is that hot-spots of disease can occur in particular places even though overall incidence is low. This is especially likely when a sire carrying a disease has been much used in a particular locality.

Selection for extreme breed characteristics

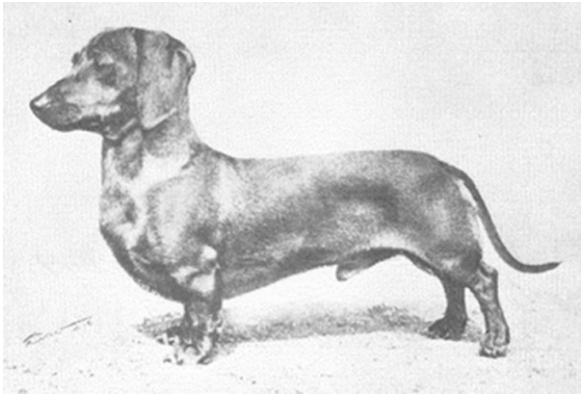
6.16 Whether or not selective breeding for extreme characteristics raises welfare problems was probably the single most contentious area of the Inquiry. I encountered strong disbelief in some quarters that breed standards have changed in the past or that some of the extreme morphologies produced by artificial selection do pose welfare problems. Some breed societies maintained that their breeds have not changed markedly in shape over time and that they are simply pursuing the perfection of form established by the breed founders. Pictorial and photographic evidence does not invariably back them up. (See pictures of the Bulldog, the Basset Houund anrovided courtesy of Colonel David Hancock) illustrate the changes in morphology of just four breeds (ie the changes in coat length in the Afghan Hound, changes in conformation of the back and hind-legs in the German Shepherd Dog, and changes in head/muzzle/eye shape in both the Bulldog and the Mastiff.) In these instances, and many others, it is evident that decisions by humans about the form of the dogs they wish to breed have, over time, resulted in marked changes in the appearance of the breed. If such changes were all welfare beneficial



Bulldog in 1866 (above) and in the present day (below



Basset Hound in 1901 (above) and in 2004 (below)



Credit: B. Thurse (above) & A.V. Walker (below)
Dachshund 1930 (above) and 2004 (below)

or at least neutral then they would not be a concern.

6.17 Strong evidence suggests, however, that certain specific phenotypes have a negative impact on welfare by creating pain or suffering; or by impeding the normal behaviour of the animal. Prominence has been rightly given to syringomyelia in Cavalier King Charles Spaniels. In this case the brain continues to grow after the skull has ossified with the result that the canal between the ventricles of the brain and the spinal cord is occluded. The eventual result is evident pain in the dogs and fitting. However, prior to that the dog may not manifest obvious clinical signs but become quiet and inactive. I was given details of one case in which the dog, termed by its owner as lazy, was given a pain-killer by the veterinary surgeon. The dog perked up after the analgesic was administered and immediately became more playful. The expression of its face was also reported to have changed. Before and after analgesia expressions are shown in the photographs.

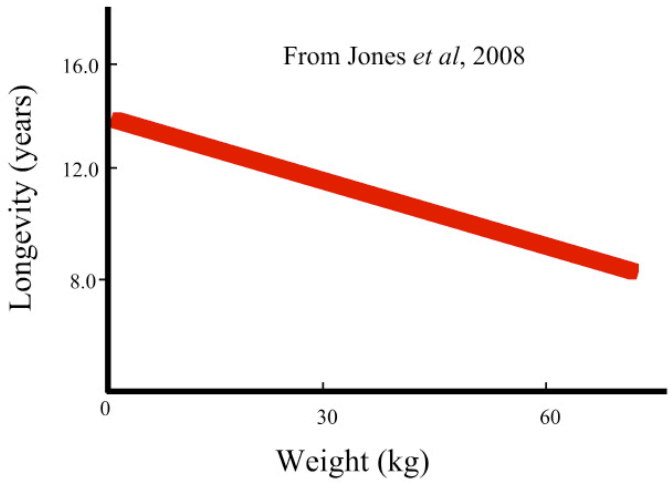
6.18 Other examples include the in-rolling of the eyelid and the consequent pain caused by the eye lashes damaging the cornea (entropion); or the eyelid drooping outwards exposing the delicate conjunctiva (ectropion). Other examples are the unhealthy skin conditions attributable to an overly wrinkled skin and the difficulty both in breathing and giving birth experienced by brachycephalic breeds.

6.19 The last point about birth difficulties is particularly striking. Evans & Adams (submitted) found that a large number of litters from a great many breeds were delivered by Caesarean section in the United Kingdom. The highest proportions were found in the breeds that had a facial skeleton that was relatively short compared to the cranial cavity (brachycephalic). Weighting the breeds for the number of cases reported, 38.8% of the brachycephalic dogs were delivered by Caesarean section as compared with 25.0% of the mesocephalic dogs and 23.8% of the long muzzled, dolichocephalic dogs. In the Boston Terrier 92.3% were delivered surgically, in the Bulldog 86.1% and in the French Bulldog 81.3%. These breeds have large heads, making normal birth difficult. Dogs strongly selected by breeders to have flattened, brachycephalic faces live on average two-three years less than other dogs matched for size (Sargan & Rooney, submitted). Those studies that have compared average age at death have found that cross breeds, and in particular small cross breeds have significantly longer

Credit: Tania O'Donnell

"Pain face" of Cavalier King Charles Spaniel before analgesia (on left) and after analgesia (on right)

average life expectancy than many pure bred and pedigree breeds. Longevity is astonishingly variable in dogs. When measured in terms of the time from birth to the age when half the individuals in that breed have died, the strongest predictor of how long an animal will survive is size (Egenvall et al., 2005; Jones et al., 2008). As can be seen in the Figure, the heavier the animal the shorter is its life. I accept, of course, that reduced longevity is not necessarily synonymous with reduced welfare or reduced quality of life. Nevertheless, the Swedish insurance data suggests than the biggest dogs are much the most likely to develop bone tumours before they die (Egenvall et al., 2007).



6.20 I conclude therefore that:

a. Form-driven selective breeding has changed the shape of well-known breeds away from the norm of 50 to 100 years ago by exaggerating specific features considered particularly characteristic of the breed such as head size and shape, shoulder width, length of back and/or legs, size (height and/or weight) and skin folds and coat length, etc.
b. In many cases, the impact on welfare has been negative. In other cases, the impact on welfare is unknown.
c. In some instances, the breed standard and selection for specific characteristics contained within it, can be demonstrated to be directly threatening to health and welfare.
d. In some instances, continued selection for certain characteristics can only continue because they are supported by veterinary medicine, which means that the faults can be corrected or compensated by surgery which in itself can cause a welfare problem and even require more than one operation.

Sale of dogs unsuited to household environments

6.21 Mars Petcare Ltd estimates than six million households keep dogs as domestic pets. It is notable that the most common reasons for dogs being consigned to re-homing shelters are behavioural. Owners have found the dogs unsuited to their life styles.

6.22 The contemporary companion animal niche poses a range of challenges. The successful pet dog needs to exhibit considerable behavioural flexibility, tolerance and adaptability but the only breeds in which artificial selection for desired patterns of behaviour has occurred are the working breeds, the sleeve dogs and possibly those used to help people with disabilities. Pet owners value social interaction with their dogs, but may leave them isolated for lengthy periods

of the day. They may then wonder why their dog exhibits stress-related and destructive patterns of behaviour. Each of the breed standards listed by the Kennel Club includes notes on the desired temperament and occasionally a warning as to "allowable weaknesses".

6.23 A large scale study of dogs' characteristics was carried out in Germany (Kubinyi et al., 2009). The published paper did not give information on breeds but found that the least calm dogs were obtained by their owners 12 weeks after birth or later. The most trainable dogs were those that had participated in three or more types of professional training. The owners of least sociable dogs generally spent less than three hours with the dog daily. Needless to say, sorting out causality in the results of such surveys is difficult but the findings are suggestive of what, on other grounds, are plausible links between the dogs' characteristics and the way that they had been treated by humans.

6.24 The contribution that good breeding and good handling can make to appropriate behaviour is doubly important, given that reduced exposure to livestock or domestic animals means, according to many, that practical animal-sense in the general human population is declining. This means that many novice pet owners have little knowledge of what to expect from a puppy and less of how to deal effectively with unwanted patterns of behaviour. Better selection for appropriate temperament (in the puppy) combined with effective socialisation in the first weeks of a puppy's life would considerably ease the transition for many and should go some way to reducing the numbers of dogs requiring re-homing or euthanasia for behavioural reasons.

6.25 A final point about dog rearing should be made in relation to the so-called weapon dogs. The Dangerous Dogs Act 1990 made illegal the ownership of certain specified breeds (Pit Bull Terrier and Pit Bull Terrier types, Japanese Tosa, Dogo Argentino and Fila Braziliero). The intention was to reduce the number of attacks by dogs on people. However, the number of people who were sufficiently hurt by dogs to be hospitalised has risen from 4238 in 1999 to 5943 in 2008 according to media reports. In several cases children have been killed after the Dangerous Dogs Act was passed in law. The problem is that other types of dog can be just as dangerous as the banned breeds and the fashion to keep dangerous dogs for defensive (and offensive) purposes and a variety of illegal activities has grown. The relevance of these trends to the Inquiry is that aggressiveness towards any human to which the dog is not attached can be bred for selectively and the trait can be greatly accentuated by the way that the dog is trained. Welfare issues arise for all dogs when some are used to attack other dogs, causing severe and sometimes fatal injuries. This is not to ignore, of course, what can happen to people and other animals such as cats.

6.26 Four broad areas have emerged where the welfare of dogs is inadequate. These are:

a. Poor management of bitches and litters in some breeding establishments.
b. Widespread inbreeding.
c. Selection for extreme breed characteristics which, over time, has resulted in the development of disabling anatomical and physiological characteristics.
d. Purchase of dogs with behavioural characteristics that are unsuited to the environmental niche which the dogs are likely to occupy, namely that of the domestic household, or by owners whose lifestyle is unsuited to owning a dog.

Chapter 7 - Ways Forward

When poor welfare of dogs arises in breeding practices, improving the situation will require cooperation and action at many different levels and by many different people: research scientists, the specialist dog breeders and the clubs to which they belong, the veterinary profession, the dog protection and re-homing charities, the members of the public who buy dogs, the Local Authorities, Central Government and Devolved Administrations, when breaches of the law persist. The means for effecting change are those that encourage, guide and (where necessary as a last resort) enforce beneficial changes in the behaviour of those connected with the breeding of dogs.

7.1 I concluded in the last chapter that serious welfare issues do arise in dog-breeding. It would be quite wrong and unfair to stigmatise all breeders as contributing to these problems. I visited breeders who have the highest standards of welfare, were passionate about caring for their dogs properly and took great trouble to ensure that their puppies went to good homes. In general they were well informed about the problems that can arise when close relatives are bred together generation after generation. What follows is not directed at them and is written in the spirit of removing the worst problems that do arise in the dog-breeding world.

7.2 The worst problems have been around for a long time. The Council of Europe's Ad Hoc Committee of Experts for the Protection of animals (Article 5, 1984) stated that "… *pet animals selected for breeding should have anatomical, physiological, and behavioural characteristics which are not likely to put at risk the health and welfare of either the offspring or the female parent*."

7.3 In 1988 a working party of the Council for Science and Society reported on companion animals in human society. This group noted the problems that arise with dog farms and also stated that: "*An increasing number of hereditary problems are being recognised in companion animals, especially dogs. Many of these are the consequences of inbreeding or breeding for genetically defective animals. Some are the result of deliberate selection for abnormal or unnaturally accentuated physical characteristics for fad or fancy. Collectively, such breeding practices are a distortion of the generally assumed responsibility man has for companion animals. Greater efforts should be made to discourage breeding for physical malformations, particularly those requiring corrective surgery.*" (Council for Science and Society, 1988)

7.4 Another 18 years passed by and the Companion Animal Welfare Council (www.cawc.org.uk) recommended that animal breeders should familiarise themselves with and respect the following code: "*The selection and breeding of companion animals can result in, or perpetuate, characteristics or inherited conditions that seriously affect the quality of animals' lives*." The Council felt it necessary to add: "*No-one should breed companion animals without careful regard to characteristics (anatomical, physiological and behavioural) that may put at risk the health and welfare of the offspring or the female parent*."

7.5 To the outsider, it seems incomprehensible that anyone should admire, let alone acquire an animal that has difficulty in breathing or walking. Yet people are passionate about owning and breeding animals which they know and love, even though the animals manifestly exhibit serious health and welfare problems. This is not the place to ask why, but casual questioning of breeders suggests that no single answer explains everything. Some people were exposed to a particular breed when they were young, some were given a dog of a particular breed, some are attracted by the opportunity to care for an animal with a health problem, and it cannot be denied that some recognise an opportunity for making money out of a breed that commands a high price, irrespective of the welfare issues. Dogs are diverse but so too are humans.

7.6 Notwithstanding the motivations of the breeders, the time has surely come for Society as a whole to take a firm grip on the welfare issues that evidently arise in dog breeding. This will require cooperation and action at many different levels and by many different people: research scientists, the specialist dog breeders and the clubs to which they belong, the veterinary profession, the dog protection and rehoming charities, the members of the public who buy dogs, the Local Authorities, Central Government and De-

volved Administrations when breaches of the law persist. The means for effecting change are therefore those that encourage, guide and (where necessary as a last resort) enforce beneficial changes in the behaviour of those connected with the breeding of dogs. To be successful this must encompass all those who have control or exert an influence on dog-breeding.

7.7 In considering the potential tools for changing human behaviour, the most powerful effects would be achieved by:

a. Ensuring that the best available science and advice is provided to breeders and owners to guide their efforts.
b. Harnessing the knowledge, skill and commitment to welfare that already exists within the dog breeding community.
c. Enabling those breeders who deliver genuinely high welfare standards to be rewarded and recognised for their efforts, both in the show ring and in the market place.
d. Educating purchasers and prospective dog owners generally on what constitutes good welfare and appropriate behaviour in dogs, and on how to identify a dog breed or type suitable for their personal circumstances
e. Helping purchasers to find a dog breeder or other source who will reliably provide a fit, healthy and appropriately socialised dog, plus necessary documentation covering identification and guidance.
f. Providing a "back-stop" of effective regulation to ensure that where commitment and goodwill are lacking, welfare standards cannot fall below an acceptable minimum.

The Need for Evidence

7.8 A means of collecting data from a broad spectrum of veterinary surgeries, referral practices, University veterinary hospitals and other major clinical centres is highly desirable. This would enable scientists to assess what disorders are presented by particular pure or cross-bred dogs and at what ages. These data are essential, both to underpin and guide the development of strategies to breed away from specific disorders and to provide the evidence on which decisions about future regulation can be based.

7.9 It is a matter of particular regret that the UK pet insurance sector, which might have helped in understanding issues of prevalence, not only failed to respond to the invitation to submit evidence to the Inquiry; but (in one key instance), when approached directly, refused point blank to share any data under any circumstances on grounds of commercial confidentiality. I believe this approach to be short-sighted. Not only would the sharing of suitably anonymised data provide a considerable public relations benefit in addressing a high profile issue of major public concern; but rigorous epidemiological analysis would also ultimately benefit the insurers by reducing claims through improvements in breed health. I very much hope that a leaf will be taken out of the book of the Swedish insurance company, Agria, and that in the UK this matter will be resolved in the near future.

7.10 In many cases, it is also clear that genetic inheritance is only one factor in the incidence of clinical disease. For example, the incidence of hip dysplasia in Labradors is not simply explained by inheritance (e.g. Zhang et al., 2009). The remaining variation in the dogs may be due to environmental factors or to interactions between genes and the environment. This would be particularly likely in the case of hip dysplasia in which obesity would be likely to interact with a genetic predisposition (e.g. Marshall et al., 2009). Good epidemiological evidence on the impact of environmental variation is needed in order to provide guidance for owners and breeders on how to reduce the welfare problems in their dogs.

7.11 Rapid improvements are being made in the development of non-invasive techniques for quizzing the animal about its state are making rapid improvements. Many of these such as testing the "cognitive bias" of the animal are being developed for the dog and will be of great value when a welfare problem is suspected. Similarly the suggestion that analgesics improve the liveliness of the dog can be helpful in diagnosing problems that remain hidden in what is actually a long-suffering animal. In order to do what is best for dogs, animal welfare experts should provide guidance on what are excellent welfare conditions.

7.12 Enormous strides have been made in the molecular biology of genetics. The canine genome like the human genome has been completely sequenced, providing an unprecedented opportunity to understand the genetics of the dog, its behaviour and its disorders. The need both to increase the number of publicly available genetic tests and to validate those available is urgent. I recognise that it is difficult to reward directly from the market place those who develop the intellectual property and hence fund the development of such tests; not least because the success of such tests is ultimately measured by the speed at which they

become less necessary. It is worth adding that a prior condition for developing new molecular tests is a good understanding of the inheritance of a given disorder.

7.13 The availability of valid genetic tests, other screening systems and even of breeding strategies does not, of itself, resolve breed specific health problems. Also required are tools for breeders to enable them to use available data to guide their breeding decisions and the development of guidance on how to reduce the clinical impact of an unfortunate genetic inheritance.

7.14 At the level of the whole organism, it is still very difficult to predict what parentage will make a show-winner. Many years ago Cattanach (1977) found that received wisdom about the benefits of crossing closely related individuals did not necessarily produce the best results in Boxers. On the contrary, 44.6% of show winners were the offspring of parents who were unrelated. A smaller proportion (38.5%) were the offspring of parents that were moderately closely related and a yet smaller proportion (16.9%) had closely related parents. When I asked expert breeders about this, some denied that Cattanach was right, but I was not convinced that they had the evidence to back up their beliefs. Using Kennel Club records it would be a relatively simple matter to discover the truth of the matter in each breed, taking into account the proportions in the shows of dogs whose parents were or were not closely related.

7.15 As Neff & Rine (2006) have argued, the existence of so many distinct morphological lines in the dog makes it a extraordinary resource for understanding fundamental problems in genetics and developmental biology. Notwithstanding the value of research into the dog as a model for human disease and the concomitant benefit to comparative medicine, such research is very poorly funded from public sources. This is an area where urgent action is needed by the major research funding organisations such as the BBSRC, MRC and Wellcome Trust. In terms of comparative medicine and translational clinical research the genetic diseases of the dog have for many years fallen between the stools due to the artificial boundaries between medical and veterinary research. It appears that studies with relevance to both human and veterinary medicine tend to be unduly penalised by the fact that they cross classical boundaries, rather than being valued according to their dual benefit. Funding streams for experimental and clinical research need to be distinguished. Work on the welfare of farm animals has been funded by Defra and BBSRC. Work on laboratory animals has been funded by the National Centre for the Replacement, Refinement and Reduction of Animals in Research. However, work on companion animals has rarely been supported by public funding in the UK and support tends to come from charitable bodies - usually to investigate specific applied matters. I agree with the experts on animal welfare on my Advisory Committee that fundamental work on the indicators of poor welfare of dogs (and, indeed, good welfare) should be funded by the Research Councils when high quality applications are made to them.

Pedigree dog breeders

7.16 Each breed of dog recognised by the Kennel Club has one or, much more usually, a number of private clubs and societies associated with that breed. Sometimes a club will take responsibility for a particular region of the UK and sometimes clubs will be set up in rivalry to each other. The Kennel Club, the organisation of which is described in Appendix 8, is also private members club and acts as an umbrella and source of standards for all the individual breed clubs. These organisations and their individual members cannot be told what to do unless they act in direct contravention of the law. Nonetheless, I hope that they will respond to advice that is given with the intention of improving the condition of the animals they care about.

7.17 In its recommendations the Council for Science and Society (1988) wrote as follows: " … *many influential members of breed societies are passionately committed to maintaining the typical appearance of breeds as they stand, regardless of the animals' ultimate welfare*." It is salutary to quote one of the CSS Working Party's recommendations with regard to hereditary problems: "*The Kennel Club and the breed societies should make more use of their dominant role in this area, and it is recommended that stricter criteria for entry and judgement at shows, etc., be introduced so as to disqualify animals with physical defects specifically encouraged by fashion and which compromise the health and welfare of the animals involved*."

7.18 I have discussed these 21 year-old points with the Officers of the Kennel Club and they emphasise that, notwithstanding the bad press they have received after the showing of *Pedigree Dogs Exposed*, they have made significant progress in raising standards over the years and providing funds for research. Every breed standard published by the Kennel Club contains injunctions to maintain the health and welfare of the breed, always assuming that all breeds have an adequate state of health and welfare to be

maintained. In the past year the Kennel Club has targeted particular breeds, including the Bulldog and the German Shepherd, where drastic action is required. Other breeds that have been singled out by the Kennel Club are: Basset Hound, Clumber Spaniel, Dogue de Bordeaux, Mastiff, Neapolitan Mastiff, Pekingese, Bloodhound, Shar-Pei, St Bernard, Chow Chow, Rhodesian Ridgeback, and Cavalier King Charles Spaniel. These developments are welcome but many people have pointed out to me that the breed standards published by the Kennel Club are not precise enough to guide the breeder towards good practice.

7.19 In collaboration with the Animal Health Trust (AHT), the Kennel Club is developing a Mate Select Facility by which breeders can find the most appropriate mate for a dam. The facility will be based on the KC web site and will allow breeders to evaluate potential matings. Usually, when a breeder is contemplating mating their bitch they will have a number of potential sires in mind. The Mate Select programme will allow breeders to provide details of the proposed dam and then a list of proposed sires. The programme will evaluate each of the sires and produce a list from the most to the least compatible sire for that particular dam. Mate Select will be available for all breeds, and the evaluations will initially be based on coefficient of relatedness. The most compatible sires will have the lowest coefficient. As Estimated Breeding Values (EBVs) are calculated for breed-specific conditions, they will also be built into these compatibility evaluations. At the moment EBVs are available for both syringomyelia and mitral valve disease in Cavalier King Charles Spaniels and hip dysplasia in Labradors. The AHT will continue producing EBVs for hip dysplasia in other breeds and EBVs for elbow dysplasia in breeds where this is seen to be a clinical issue. This particular use of the Mate Select Programme is geared toward the serious dog breeder who puts a great deal of thought into the choice of potential sires for their dam. In due course facilities for the casual breeder will also be developed.

7.20 I note the considerable efforts made by the Kennel Club with regard to the education and training of judges. Attention has been drawn to the new guidance on welfare issues, the training offered to judges, the monitoring of their performance and the emphasis on fitness of dogs to behave normally.

7.21 Even so, the Kennel Club and the breed societies are faced with serious problems when attempting to influence people who reckon that they have nothing to learn and resent bureaucratic interference. The Kennel Club fears that if the breed clubs were pushed too hard to change their ways, some of them would secede. The Club's revenue stream and its influence could be seriously disrupted and arguably the welfare of dogs might also be compromised.

7.22 A second problem for the Kennel Club is that it is difficult for the club to be both judge and jury when introducing proposals for reforms to breeders who hold strong opinions about dog breeding and are often deeply intransigent. In the next Chapter I recommend the establishment of an Advisory Council on Dog Breeding. I believe that such a Council might make this aspect of the Kennel Club's work somewhat easier.

7.23 I believe that the Kennel Club could benefit from broadening its governance on three counts:

a. The involvement of relevant but independent experts in the governance of the Kennel Club would provide appropriate challenge and assurance with regard to issues that have a major impact beyond the Club's membership.
b. Broadening the range of skills and expertise on which the club can call would improve the balance of advice on detailed technical and scientific points.
c. Strengthening the independence of the Club's public image would positively reinforce efforts to change breed club attitudes and breeding priorities where necessary.

7.24 I suggest, therefore, that that the Kennel Club might wish to consider appointing a number of both scientific and lay members to its General Committee, selected by open competition rather than from the membership, and with a specific remit to provide advice on those matters affecting the welfare of dogs. I appreciate that the Scientific Advisory Committee already contains such members, but my sense is that the Club would be wise to extend the principle more widely.

7.25 I was persuaded that showing and judging constitute a powerful lever for change. That has been demonstrated clearly in the past in the documented and undisputed changes in form that have taken place in many breeds. My concern therefore is that this powerful lever should be effectively applied to achieve the desired improvements in welfare.

7.26 Judging is not an exact science but it needs to be informed by recent advances in knowledge. It would be improved with a mechanism for re-training

or updating judges over time (what in other circles would be termed continuing development). It would also be enhanced by the introduction of a mechanism for singling out judges who manifestly upheld welfare principles and kept themselves up-to-date.

7.27 Showing is not just a means of rewarding excellence in a breed; it is also an opportunity to educate and inform both breeders and onlookers. I believe that everybody would benefit if the judges were able to supply immediate advice to those who did not gain a prize in a show. This would be particularly helpful when the judge had picked up a health or welfare problem such as movement difficulty in a dog. I appreciate the practical problems that can arise in tightly timed shows involving large numbers of dogs, but wherever possible the principle of providing advice should be encouraged.

7.28 Selection for form rather than use has created in specific breeds a number of welfare problems that need to be addressed. In principle, the problems that breeding has created can be solved by breeding, provided the remaining populations still contain sufficient genetic diversity; but the issues are further complicated by the twin needs to avoid inbreeding and to breed away from specific inherited disorders. Resolution of these issues will therefore require carefully considered breed-specific breeding strategies if priority problems, as assessed by independent experts, are to be addressed effectively.

7.29 The view of my expert advisors in genetics is that sufficient genetic variation exists within dogs as a whole - and in many cases within individual breeds - to enable effective selection towards a high welfare status dog. That is not necessarily the case within all breeds. Where a particular breed is now homozygous for a characteristic with health or welfare problems, then evidence-based outcrossing to resolve problems must not be ruled out simply to support what are no more than artificial boundaries around breeds.

7.30 The larger breeders can play very important roles in breeding away from poor health conditions that have become established in a breed. When enough genetic variation exists in a breed, it is possible to select individuals for mating that do not carry the defect. If not, outcrossing to a different breed should not be regarded as an abomination. Outcrossing can sometimes carry health risks, but several cases have established that once the out-crossed puppies are obtained, artificial selection can ensure that healthy dogs with the desired features of the breed are rapidly recovered (e.g. American Dalmatian, Dorset Old Tyme Bulldog, Victorian Bulldog and some Australian Bulldogs).

7.32 Indrebø (2008) made some wise remarks about the drawbacks of over-zealous breeding procedures. She pointed out that making too stringent demands in eradication programmes may eradicate the best breeders from the programme instead of diseases from the dogs. Nevertheless, her own recommendations were firm. It is worth restating some of them:

a. If a dog suffers clinically from a disease that is suspected, but not proven, to be inherited, the dog should not be bred. If close relatives of such a dog are used for breeding, they should be mated to dogs from bloodlines with low or no occurrence of the same disease.
b. Over a five year period no dog should have more offspring than 5% of the total number of puppies registered for that breed.
c. A bitch that is unable to give birth normally should be excluded from further breeding – irrespective of the breed.
d. A bitch that is unable or unwilling to take care of its newborn puppies should be excluded from further breeding.
e. Dogs that behave atypically for the breed or are unduly aggressive should be excluded from breeding.
f. Screening for polygenic diseases should only be recommended for diseases and breeds where the disease has a major impact on the dogs' functional health.
g. Breed specific health issues that cannot be diagnosed by DNA-tests or screening programs must still be included in a breeding program.

7.33 The great majority of breeders of pedigree dogs produce only one or even less than one litter per year. Many of these people make considerable efforts to inform themselves about what is best for their breed but, as far as I can judge, many are dependent on inexpert and out of date advice. Single numbers produced by the scientists on the estimated breeding value of an individual, effective breeding population, coefficient of inbreeding, heritability estimates and so forth all have their place but none of them are panaceas and all can be easily misunderstood. The best advice that can be given to the small-scale breeder is:

a. Inform yourself about the main hereditary diseases in the breed.
b. Consult your veterinary surgeon about the

wisdom of using your dog for breeding before committing to a mating.

c. Do not mate a bitch with a sire that is known to express one of the serious hereditary diseases.
d. Avoid very close inbreeding. Grand-daughter mated with grand-father is too close in my view. A good rule of thumb is that, if the pedigrees of the potential mates include more than two grandparents, avoid that mating (see Paragraph 3.20).
e. If a dog is taken to a show and fails to be placed, ask the judge why.

7.34 The challenge of identifying high welfare status breeders reliably could be addressed through the application of a rigorous, robustly policed and well-respected quality assurance scheme. No current scheme fully matches those criteria. The Kennel Club Accredited Breeder Scheme comes the closest and has made a good start; but undoubtedly requires upgrading before it can be seen to deliver assurance of good welfare standards for both parents and litters (actual and prospective). The scheme should provide above all assurance to a purchaser that every reasonable action has been taken to ensure the health and welfare of the puppy they buy. The Kennel Club has taken steps to ensure that the premises of accredited breeders are regularly inspected and might in the fullness of time make the scheme compulsory for all large scale breeders who seek to register their puppies. I believe that they should act promptly to upgrade yet further their scheme and the minimum conditions for such a scheme should be that:

a. All pre-mating tests for inherited disease appropriate to the breed or breeds are undertaken on both parents.
b. No mating takes place if the tests indicate that it would be inadvisable in the sense that it is likely to produce welfare problems in the offspring and/or is inadvisable in the context of a relevant breeding strategy.
c. Any prospective final purchaser is able to view the puppies with their mother.
d. Every puppy is identified by microchip prior to sale.
e. All pre-sale tests on the puppy which are appropriate to the breed have been carried out.
f. The scheme establishes and requires clear, written standards of management with regard to the housing, health, exercising and socialising of all dogs on the premises managed by the registered breeder, including establishing minimum staffing levels appropriate to the numbers of dogs involved.
g. All relevant documentation connected with the puppy including, inter alia, advice on feeding and care, registration documents, details of vaccinations etc are handed over to the purchaser at the time of sale. When an appropriate contract is available this should be signed by both parties.
h. All accredited breeders are inspected by duly appointed and trained scheme inspectors against the written standard, either before or shortly after registration with the assurance scheme; and regularly thereafter.
i. Non-compliance with the standards of the scheme results in de-registration.
j. If accolades are to be awarded to any breeder under an accredited scheme, they should clearly and solely relate to the provision of higher welfare standards.

I suggest that a useful interim measure would be to offer a lower fee for the registration of a puppy to those breeders who are Accredited Breeders, thereby providing an incentive to join the scheme. Other incentives could also encourage wider acceptance such as negotiating reduced insurance premiums for Accredited Breeders and ultimately reduced levels of Local Authority inspection.

The Veterinary Profession

7.35 The veterinary profession faces a dilemma with regard to small animal welfare in general and dogs in particular. Many of the conditions facing dogs as a result of selective breeding are subject to surgical correction. It is only the ready availability of modern veterinary medicine that has permitted some conditions – such as the inability to give birth without surgical intervention – to become widespread. Veterinary surgeons, both in perception and potentially in reality, face two conflicts of interest:

a. The conflict between the income they derive from correcting faults and their duty to advise against breeding practices that cause such faults to proliferate.
b. The conflict between what they should advise their client to do and what their client wants to do.

The latter is most starkly exposed in the non-reporting of dogs with poor hip scores.

7.36 I acknowledge that in many cases the individual veterinary surgeon has little or no opportunity to provide timely advice to a client considering either breeding from a bitch or

purchasing a puppy. In most instances the client is already committed before advice is sought.

7.37 In some areas, however, the profession could take a lead where it would be both practicable and reasonable for it to do so. These include:

a. Collection of anonymised data from veterinary surgeries.
b. Provision of assistance and information in support of moves to reduce the incidence of specific conditions.
c. Provision of expert support for the enforcement of dog breeding and sales legislation, perhaps at pro bono rates (as do the legal profession when working in the public interest).

Education of Purchasers

7.38 Following the screening on the BBC of *Pedigree Dogs Exposed*, all dog breeders - good and bad alike - were on the receiving end of considerable public criticism – in many cases unjustified. Little consideration has been given, however, to the culpability of the buying Public.

7.39 How many people who have bought puppies have stopped to consider the impact of their purchasing decisions? If the Public only bought puppies from health screened parents, if everybody refused to buy a puppy until they had seen its mother and satisfied themselves that the conditions under which it was reared were safe, healthy and provided a life worth living for parent and puppy, if everybody took the sensible step of finding the breed that would best suit their family and their living conditions, then poor breeders would be out of business and far fewer dogs would require re-homing.

7.40 Sadly, that is not how many people behave. Puppies are bought on impulse from a pet supermarket (or worse still from someone who arranges to meet the buyer, for example, in a car park) without the purchaser seeing the breeder's premises or the puppy's mother, without knowing what health screening should have taken place, without noticing that the puppies are stressed, lonely and bored, without any idea whether that particular breed will suit the purchaser's family, be child-friendly or not, fit the size of the home, or need the sort of exercise and training the family is able and willing to provide. For as long as many people buy dogs in that way, bad dog breeding practices are likely to continue.

7.41 Arguably the most powerful pressure for change is that exercised by the consumer. Unfortunately in the case of dogs and puppy buying the market place malfunctions, in the sense that attention to good welfare on the part of breeders is not effectively rewarded by higher returns from their puppy sales and poor welfare is not penalised. On the contrary, it is clearly possible for large volume breeders and vendors to run profitable businesses without providing high levels of welfare for either their breeding stock or the litters of puppies. Part of the problem undoubtedly lies in the fact that, while in most commercial areas purchases that are found to be unsatisfactory are returned and a replacement or refund requested, in the case of a puppy the new owner has already bonded with it by the time a problem is detected.

7.42 I have seen a draft contract that can be made between the breeder and buyer of a puppy prepared by the British Veterinary Association. This may be a welcome development in serving to raise awareness among buyers and sellers of puppies. Whether or not such a contract will be widely adopted and can be enforced when breaches occur remains to be seen.

7.43 If they have not already done so, good breeders will ultimately address the issues that are now being brought to the Public's attention because they care about the welfare of their dogs and their breed. Nevertheless, the issues will only be addressed by all breeders, even the worst, when it is only commercially viable to breed dogs well, because those are the only dogs that sell.

7.44 Four things follow from these considerations:

a. Purchasers should be encouraged to satisfy themselves that they are ready to buy a dog, with all the responsibilities that dog ownership implies.
b. Purchasers should be taught what to consider when buying a dog;
c. They should understand the benefits of buying from a good breeder (and the risks of buying from a bad one).
d. They should be able to identify the good breeders reliably and as easily as possible.

In order to address some of these issues. it will be necessary to design and deliver a comprehensive education and training programme utilising a range of media and influencing strategies. I understand that the

welfare charities singly and, in a united way under the umbrella organisation of the Pet Advertising Advisory Group (PAAG), are already making very substantial efforts to educate the dog buying public. In my view the more that can be done to support and extend this work the better it will be for the welfare of dogs.

The Legal Framework and Enforcement

Local Authorities

7.45 Most of the issues arising from treating dogs as commodities are, or should be, subject to control under the Breeding of Dogs Act 1973, The Breeding of Dogs Act 1991 and the Breeding and Sale of Dogs (Welfare) Act 1999. These Acts require anyone who is in the business of breeding and selling dogs to have a licence from the local authority. The local authority has discretion whether to grant a licence and must ensure that the animals will be suitably accommodated, fed, exercised and protected from disease and fire. The 1999 Act also provides (inter alia) that bitches are not mated until they are at least one year old and that they give birth to no more than six litters in a lifetime and no more than one litter per year, and puppies are not sold at less than 8 weeks old other than to a keeper of a licensed pet shop. The Pet Animals Act (1951) sets standards for the regulation and licensing of pet shops by local authorities.

7.46 As I noted in the last Chapter, it would seem that these legal controls covering the breeding of dogs do not effectively protect the dogs' welfare. Local Authorities experience some difficulty in enforcing the legislation. Key issues include the degree of judgment that has to be exercised by the enforcement officers (normally Environmental Health Officers) with regard to whether five litters are or will be produced by a breeder within a 12 month period and the extent to which requirements for health and welfare are adequate. Judgments about hygiene and accommodation conditions can be aided by the application of prescribed standards. Judgments on exercise and socialisation regimes are more complex and may require the expertise of veterinary surgeons, behavioural biologists and animal welfare specialists.

7.47 Only very limited data on the occurrence of welfare problems arising from poor management and/or negligence are available. Individual cases, particularly extreme examples, are well-recorded; but no central enforcement database exists across England, still less the United Kingdom as a whole. Some of these shortcomings would be resolved if a definitive, nation-wide list of the dog breeders registered with Local Authorities were prepared. Matters would be further helped if precise data on the numbers of puppies bred or sold each year were available. Similarly the numbers imported should be recorded and the provenance of the animals examined.

7.48 In many quarters the view is strongly expressed that each dog in the United Kingdom should be microchipped, preferably by the breeder. One argument for doing so is that microchipping would greatly facilitate those whose job it is to control abuses of dog welfare by making it much easier to trace animals back to the owner and breeder. It would enable owners of errant pets to get them back more easily and also make dog owners more responsible. It would be a deterrent against dog theft and possibly lead to savings to Local Authorities by reducing kenneling costs.

Devolved Government

7.49 The Welsh Assembly Government, under the Companion Animal Welfare Enhancement Scheme programme has announced a Review of the legislation and guidance for the licensing of dog breeding establishments. This review, which is to be completed by June 2010, will include consideration of compulsory microchipping.

Central Government

7.50 Large numbers of puppies are imported from the Republic of Ireland, which does not have equivalent legal controls to those existing in the United Kingdom. Furthermore a fear has been expressed that dangerous dogs are being or soon will be imported from other parts of the European Union. A case could be made for statutory control over these imports on grounds of welfare, expense in re-homing (sometimes shouldered by the Police as well as the charities) and public safety. I am told, however, that any prohibition on the entry of dogs into the UK from Ireland or other parts of the EU would be illegal at present.

7.51 At present the Animal Welfare Act 2006 for England and Wales and the Animal Health and Welfare (Scotland) Act 2006 impose a duty of care on the breeder with regard to the animals in his or her possession. No duty of care is imposed with regard to animals that have left their possession (other than those generally applying to sales of goods) even though the poor health or welfare of the animals was a consequence of actions taken by the breeder. Consideration should be given to whether or not such a duty should be imposed by regulations introduced within the scope of the Acts.

7.52 Legislation cannot, alone, create the conditions for behavioural change. Moreover, no statute can be effective which is not supported by a majority of the population. Legislation should therefore be regarded not as the primary agent of change but rather as a back-stop – a means of saying "thus far and no further" to the minority in Society who are not minded to do the right things for ethical reasons, nor obliged to do them by economic forces in an ineffective market place.

7.53 Already a considerable body of legislation exists in the animal welfare area and I am aware of the costs, both in Parliamentary time and in financial resource, that are required to make new legislation or amend existing statutes. I am also aware of the "Better Regulation" agenda and have sought to make my recommendations compliant with its objectives – not least because I agree that positive incentives, self-regulation and education are more effective, more resource efficient and more flexible tools than formal regulation. Hence, all the changes mentioned above can be achieved without resource to amending the statute book.

7.54 However, in some areas where common standards should apply to all practitioners in the field, where non-statutory solutions will not be fully effective in achieving the desired changes, and where sufficient evidence to justify some legislative changes exists, changes to legislation will be necessary.

7.55 With regard to the legislation surrounding the breeding and sale of dogs, I consider that the provisions could, with benefit, be reviewed and re-presented as regulations under the Animal Welfare Acts. Defra officials told me that it would not be in accordance with Better Regulation to introduce legislation aimed at helping local authorities to tackle the problem of puppy farming if improvements could be achieved by other means (such as accreditation schemes). Under Better Regulation, Ministers are required to ensure that any statutory regulations take full account of what can be achieved through schemes that do not require central or local government intervention. However, I would not wish this to be used as an excuse for indefinitely delaying a broad review of existing legislation.

Discussion

7.56 Action to avoid or reduce levels of inbreeding needs also to balance the competing priorities to breed away from breed specific disorders while preserving characteristics of the breed. The solutions therefore need to be breed specific. Some progress has been made in developing breeding strategies for certain breeds, but much remains to be done. Moreover, this task is exceedingly difficult for any breed society to undertake on its own, no matter how well motivated and informed. The best solution to identifying means of addressing issues is to establish a mixed discipline team (including the breed society, geneticists, veterinary surgeons and other relevant scientific specialists) to find the root cause of inherited problems and to develop solutions that are effective and practicable.

7.57 The flaws and shortcomings in the currently available data are clear and remedying these gaps in knowledge should be given high priority. I do not accept that nothing needs to be done until more data are available. In considering how to address the issue of improving welfare for dogs, it is helpful to characterise the desired end result. Ultimately, the aim is for a society in which:

a. Sound scientific data is available to guide decisions and advice.
b. The primary and overriding objective for all dog breeders and show judges is the welfare of the individual dogs and of the breed as a whole, to which all cosmetic and breed specific criteria are subordinate.
c. Breeders are able and willing to use available scientific data to guide their breeding decisions in order to achieve their welfare objectives and reduce levels of inbreeding.
d. The veterinary profession, collectively and individually, combine preventative medicine with their curative and remedial work through the provision of screening programmes and science driven advice.
e. Purchasers are educated and informed in their approach to selecting a breed and an individual dog; they are aware of health and welfare risks with regard to particular breeds or crosses, know how to find a breeder who can deliver genuinely high welfare status puppies, and take advantage of specialist screening and advice in order to ensure that when they invest in a dog they find one that is fit for their home environment in terms of type, temperament, health and socialisation.

7.58 Achieving the shift from where we are now to the desired end state is primarily an issue of behavioural change on the part of breeders, owners, veterinary surgeons, purchasers and all those bodies with an interest in dog welfare. However, all initiatives for change should be evidence-based. As a matter of

high priority, a health and welfare recording system should be established enabling data on the prevalence of specific disorders, by breed or cross-breed, to be collected from veterinary surgeries and elsewhere.

7.59 A number of respondents, including the Companion Animal Welfare Council, have advocated the creation of an "umbrella" council on dog breeding. I have considered carefully whether the principle of creating an independent and multidisciplinary team to provide guidance has real merit. For reasons of both practicality and financing, it would be essential that any such body had precisely defined functions, created the minimum of additional bureaucracy and cost, and was seen to be genuinely independent and expert. A firm recommendation is made in the next Chapter and a proposal for the terms of reference and structure for an Advisory Council on Dog Breeding is given in Appendix 7.

7.60 While this report addresses the specific problems that have arisen in dog breeding, many of the same issues arise with other sentient animals such as cats. Obsession with the purity of the breed and drives towards extremes of conformation crop up again and again in animal breeding. I hope that some of the lessons that have been learned and continue to be learned from dog breeding will be taken to heart by those concerned with other species.

7.61 The context of this report was necessarily the dog breeding situation as it currently exists in the United Kingdom. However, many other countries have developed ways of dealing with some aspects of the problems of dog breeding that arise in the United Kingdom. As progress is made in solving these problems, co-operation between countries will be highly advantageous and it is to be hoped that the processes informing legislative changes made in this country will not be unduly parochial.

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Chapter 8 - Recommendations

The recommendations are summarised in the Executive Summary at the beginning of the Report. For ease of reference, the recommendations below are grouped by the subjects that address the following issues:

a. Inbreeding and inherited disease and the selection for extreme morphologies.
b. Poor or negligent management and care of breeding dogs
c. Inadequacies in the way dogs are bought and sold

Some recommendations are relevant to more than one issue.

Addressing inbreeding, inherited disease and selection for extreme morphologies

8.1 A non-statutory Advisory Council on Dog Breeding should be established. The key role of the Council should be to develop evidence-based breeding strategies that address the issues of poor conformation, inherited disease and inbreeding as appropriate to the specific breed and to provide advice on the priorities for research and development in these areas. I recommend that the Advisory Council members and Chairman should be appointed by open competition according to Nolan Principles. Defra should manage the selection process, drawing appropriately upon the advice of the devolved authorities and experts. Members should be selected on the basis of their personal expertise and not with regard to any personal affiliation or membership. Draft terms of reference and proposals for funding the Council are given at Appendix 7.

8.2 High priority should be given to the creation of a computer-based system for the collection of anonymised diagnoses from veterinary surgeries in order to provide statistically significant prevalence data for each breed. This should build upon the work already started by the Royal Veterinary College. It is important that this scheme is fully supported by the Royal College of Veterinary Surgeons. In a pilot scheme, priority should be given to collecting data with respect to the conditions creating the greatest welfare challenges in terms of pain, impact on quality of life, capacity for correction, and early age of onset. The data collected should relate both to the incidence of inherited disease and to the incidence of veterinary procedures necessary to correct faults due to selection for extreme morphologies (e.g. Caesarean sections, corrections for entropion, soft palate resections, etc).

8.3 Revisions of Breed Standards should recognise the need to avoid the selection for extreme morphologies that can damage the health and welfare of the dog. When possible, revisions should involve guidance from the Advisory Council on Dog Breeding. Where a welfare problem already exists within a breed, the breed standard should be amended specifically to encourage the selection for morphologies that will improve the welfare status of the breed. In these instances the breed standard may need to be more precise, either by aid of diagrams or quantitative ratios, in order to encourage the necessary changes.

8.4 I have recommended to the Kennel Club that it upgrades its Accredited Breeder Scheme promptly. If it is unable to do so and no other body steps forward to supply an appropriately robust and UKAS accredited scheme, a new scheme should be implemented under the auspices of the Advisory Council on Dog Breeding. The organisers of any accredited breeder scheme should apply for and obtain UKAS accreditation. The minimum conditions for such a scheme should be that:

a. All pre-mating tests for inherited disease appropriate to the breed or breeds are undertaken on both parents.
b. No mating takes place if the tests indicate that it would be inadvisable in the sense that it is likely to produce welfare problems in the offspring and/or is inadvisable in the context of a relevant breeding strategy (see also 8.2).
c. Any prospective purchaser is able to view the puppies with their mother.
d. Every puppy is identified by microchip prior to

sale.

e. All pre-sale tests on the puppy which are appropriate to the breed have been carried out.
f. The scheme establishes and requires clear, written standards of management with regard to the housing, health, exercising and socialising of all dogs on the premises managed by the registered breeder, including establishing minimum staffing levels appropriate to the numbers of dogs involved.
g. All relevant documentation connected with the puppy including, inter alia, advice on feeding and care, registration documents, details of vaccinations etc are handed over to the purchaser at the time of sale. When an appropriate contract is available this should be signed by both parties.
h. All assured breeders are inspected by duly appointed and trained scheme inspectors against the written standard, either before or shortly after registration with the assurance scheme; and regularly thereafter.
i. Non-compliance with the standards of the scheme results in de-registration.
j. If accolades are to be awarded to any breeder under an accredited scheme, they should clearly and solely relate to the provision of higher welfare standards.

8.5 Working with the profession as a whole, the RCVS and the BVA should lead a shift in emphasis towards preventative veterinary medicine rather than simply focus on the correction of problems after they have occurred.

Addressing poor or negligent management in the care of breeding dogs

8.6 When inspecting the premises of breeders that require licences, Local Authorities should address all welfare issues covered by the Animal Welfare Act 2006, especially those relating to dog behaviour. In issuing a licence Local Authorities should specify the staffing levels necessary to ensure appropriate health and welfare, including exercise of parents and socialisation of the puppies. To facilitate this, licensed premises should be required to maintain records of staffing and those records should be available for inspection. Breeders' records should be inspected to ensure that breed-appropriate pre-mating tests and screening programmes have been carried out with regard to both parents and that decisions to breed are appropriate in the light of the results.

8.7 Irrespective of whether they are members of an Accredited Breeder scheme, all breeders should have their puppies microchipped before they are sold. Prospective purchasers should expect that this has been done before buying a puppy.

8.8 As soon as Parliamentary time permits, Regulations should be made under the Animal Welfare Act 2006 in order to:

a. Require that all puppies should be indelibly identified, by implantation of microchip or such other equivalent system as may be developed, prior to sale; and that the ID number of the microchip or equivalent should be recorded on the contract of sale, all relevant health test certificates and registration documents and a central data base.
b. Create an obligation on any person breeding dogs to have regard to the health and welfare of both the parents and the offspring of the mating.
c. Require that any body laying down breed standards must have regard to the health and welfare of the dogs and the need to avoid breed specific health problems; and that in exercising such a power, the body could be regarded as exercising a power of a public nature and thus be susceptible to judicial review.
d. Create such offences with regard to the above as seem appropriate.

8.9 Defra should implement a statutory Code of Practice on the Breeding of Dogs under Section 14 of the Act. The Code should encompass such issues as:

a. The health and welfare of the parent dogs.
b. The appropriate screening and testing of parents for breed specific disorders, as laid down in the relevant breeding strategy for the breed (or breeds) concerned.
c. In selection of parents, due consideration being given to compliance with such elements of a breed standard as are intended to avoid extremes of conformation that create welfare problems.
d. The health, welfare and appropriate socialisation of litters of puppies, in order to fit them for their future function.
e. Mechanisms for the sale of the puppies.
f. When UKAS accredited quality assurance schemes address all the issues covered by the code, the Code should recommend membership of such an accreditation scheme.

8.10 When Parliamentary time permits, regulations

should be introduced to replace the various Breeding and Sales of Dogs Acts. In drafting these regulations, consideration should be given to amending the definition of premises that require licensing in order to simplify and make more effective the enforcement of licensing standards and compliance with the provisions of the Animal Welfare Acts. Enforcement authorities should be enabled to carry out inspections on the basis of a risk assessment and to take account of achievement of accredited status under an appropriately enforced and audited accreditation scheme. In order both to facilitate effective enforcement and to encourage a responsible approach to purchasing by the general public, enforcement authorities should be required to maintain a list of licensed premises which is accessible on-line by the public. Consideration should also be given to creating a centralised database of persons who have been convicted or cautioned under animal welfare legislation. The Dangerous Dogs Act should be amended to apply to all dogs that have been shown to be dangerous rather than to specified breeds and should address the problem of dogs being bred and reared specifically as weapons or for fighting.

8.11 The British Veterinary Association should compile, and provide to Local Authorities, a list of veterinary practitioners willing to carry out and/or support inspections of licensed breeding premises.

Addressing inadequacies in the way dogs are bought and sold

8.12 Complementing all existing schemes, a public awareness and education campaign should be designed by expert practitioners, in order to persuade members of the general dog-buying public to change their behaviour in specific key respects and to provide readily comprehensible information on what questions to ask and what to look for when buying a dog. This should be supported and run by as many as possible of the dog and animal welfare organisations, acting jointly and in unanimity.

8.13 When robust and audited accreditation scheme(s) are available, the buying public should be pointed with confidence towards the accredited breeders as offering a genuinely higher standard of health and welfare to the animals in their care and thus towards a fit, healthy and appropriately socialised puppy.

8.14 The report by APGAW (2009) was published in November 2009. As I have already noted, their brief was narrower than mine, but where the focus of the two inquiries overlap, the recommendations should be brought together. I welcome the suggestion of the RSPCA that a meeting of the relevant parties should be convened as soon as possible after the publication of the present report.

Acknowledgements

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Appendix 1 – Terms of Reference

The overall objective of the Review Board is "To consider whether the health and welfare of dogs, and particularly pedigree dogs, is affected and/or can be improved by reference to the registration, breeding and showing of dogs."

The Review Board would take evidence from a wide field including dog breeders, dog show representatives, members and officials of the Kennel Club, veterinary organisations, governments (including devolved administrations), animal welfare charities, and other appropriate bodies.

The Review Board will take evidence to determine in relation to the breeding of all dogs:

a. Whether there should be compulsory registration of all dogs used for breeding and if so how the minimum standards should be set and enforced for those who breed dogs, for the dogs used for such breeding and for those organisations that maintain such registers.
b. Whether current breed standards for pedigree dogs are appropriate to protect the health and welfare of pedigree dogs;
c. What is currently being done to improve the health of dogs being bred and by whom;
d. How efforts to research and control inherited disease should be led and how these should be paid for;
e. Whether specific government legislation or other mechanisms are required to protect the welfare of all dogs being bred from.
f. Whether registries should be obliged to refuse registration in the event that required minimum standards are not met.

And recommend actions to be taken.

The Review should advise on and take full account of the available evidence and of the practical aspects (including the funding) of enforcement and implementation of the recommendations presented.

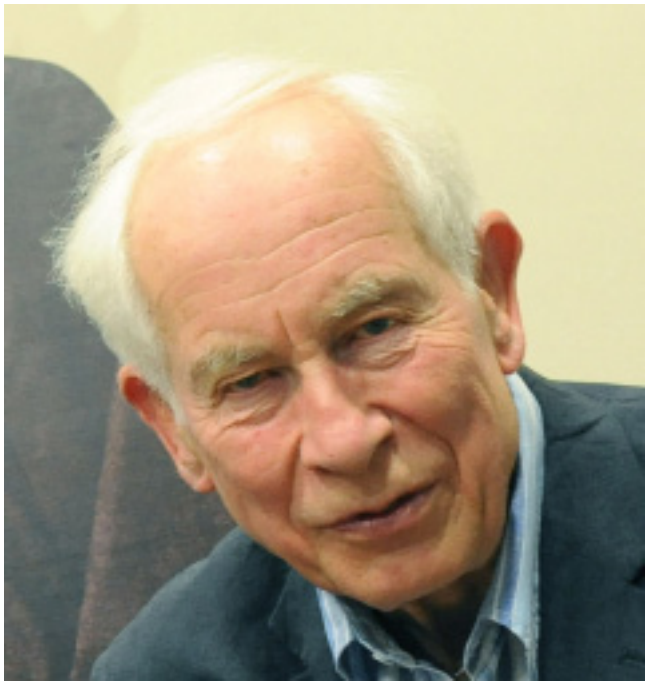
It is requested that the Review Board report on findings by the end of April 2009.

Costs of the Review will be borne by the Kennel Club and Dogs Trust.

Note: At my meeting with representatives of the Dogs Trust and Kennel Club in January it was agreed that the April deadline was unrealistic.

Appendix 2 - Short biographies of Bateson and Peck

Patrick Bateson



Patrick Bateson was Professor of Ethology, the biological study of behaviour, at the University of Cambridge (1984-2005). He was Provost of King's College, Cambridge (1988 to 2003). He was formerly Director of the Sub-Department of Animal Behaviour at Cambridge and later Head of the Department of Zoology. He was Vice-Chairman of the Museums and Galleries Commission and in 2004 was elected President of the Zoological Society of London. He was elected a Fellow of the Royal Society of London in 1983 and was its Biological Secretary and Vice-President from 1998 to 2003. He was knighted in 2003. He is a foreign member of the American Philosophical Society. He has edited 15 books and is co-author (with Paul Martin) of *Measuring Behaviour*. Cambridge University Press (3rd edition pub 2007); and *Design for a Life: How Behaviour Develops*. London: Cape (1999). He currently breeds (in a small way) Egyptian Mau cats.

Heather Peck

In addition to her role on the Inquiry, Heather Peck provides advice and assistance on agriculture and animal welfare policy, is Director of Strategy at Chamberlain (Ware Anthony Rust), Chairman of the Oxford Farming Conference 2010, Chairman of the CEL Wheat Committee and Deputy Chairman of Cambridgeshire Community Services (NHS). Previously, during a long career in MAFF and then Defra, she was responsible for a wide range of policy areas including pesticides, plant varieties, research policy and animal welfare. She was Regional Operations Director for a succession of avian flu outbreaks and for part of the response to the 2007 Foot and Mouth Disease outbreak, and still continues in this role. She has also been a commercial breeder of both pedigree sheep and alpacas.

Appendix 3 – Advisory Group to the Inquiry

Chairman: Professor Sir Patrick Bateson MA PhD ScD FRS
Emeritus Professor of Ethology, University of Cambridge

Members: Professor William Amos BA PhD
Professor of Evolutionary Genetics, Cambridge University

Andrew Ash BVet Med, MRCVS
Junior Vice-President BSAVA, Grove Lodge Veterinary Group Ltd

Dr Brian Catchpole BVetMed PhD MRCVS
Senior Lecturer in Veterinary Immunology, Royal Veterinary College

Dr Bruce M Cattanach BSc PhD DSc FRS
Emeritus scientist, MRC Mammalian Genetics Unit, Harwell

Professor Sheila Crispin PhD FRCVS
University of Bristol

Professor Ian McConnell BVMS MA PhD MRCVS
Emeritus Professor, University of Cambridge

Dr Roger Mugford PhD
Company of Animals

Professor Christine Nicol MA DPhil
Professor of Animal Welfare, University of Bristol

Secretary: Mrs Heather Peck BSc FCIPD

Appendix 4 – Associate Parliamentary Group on Animal Welfare Remit

Background/Present Situation
In August 2008, the documentary 'Pedigree Dogs Exposed' highlighted the serious issues arising from genetic disease owing to decades of inbreeding which has been further emphasized by the showring requirement for looks over and above function and health. This led to many welfare organizations such as the RSPCA, Dog's Trust, Blue Cross calling for something to be done and following requests APGAW has set up a working group to investigate the welfare and fate of pedigree dogs.

Remit of the research and objective
To investigate the welfare issues surrounding pedigree dogs following on from the recent expose about the issues surrounding breeding and hereditary diseases, to identify factors which may improve standards at all stages of dogs' lives, and to advise on measures suitable for secondary legislation concerning the issue under the Animal Welfare Bill

Terms of reference
1. To take evidence from interested parties about the health and welfare implications of pedigree dogs bred to current Kennel Club breed standards.
2. To produce a report outlining the main issues and recommendations for improvements/changes to current practices.
3. Although some specific breed examples will be useful as case studies the aim of the report is to consider current practices in general to get an overview

Possible areas to investigate
- Numbers of dogs involved
- Structure of the breeding and showing industry
- Regulation of the industry – Kennel Club, Animal Welfare Act
- Financing of the industry
- Identification of dogs to establish parentage and breeder

Proposed membership of the Group
The enquiry should have an advisory panel made up of the key organisations. The enquiry should have 6-12 politicians on it from both Houses. The Group will be Chaired by Eric Martlew MP. It will be important to ensure a fair balance of party representation as well as a balance of views on the pedigree dog industry.

Format
The Group will be run along similar lines to a select committee and will be made up of a small number of members of both houses. A general call for written evidence will be sent out and this will be followed by a number of oral evidence sessions. The current APGAW Secretary will provide the services of a committee clerk, taking notes at meetings and evidence sessions and pulling the views of the members of the Group together into a coherent report. All meetings of the Working Group and evidence sessions will be held in private. The aim will be to publish a report in early-mid 2009.

Possible organisations to seek verbal and/or written evidence from:

All APGAW associate members , DEFRA, The Kennel Club, Individual pedigree dog breeders, Crufts Promoters , Dogs Trust, RSPCA, Battersea Dogs Home, British Veterinary Association

Funding
The publication of the report would be funded by APGAW

Appendix 5 – Call for Evidence

Professor Sir Patrick Bateson FRS of Cambridge University has been appointed to conduct an independent inquiry into the breeding of dogs. The Inquiry is funded jointly by the Dogs Trust and the Kennel Club but is operating independently of both organisations. The review has the support of the Government's Department for the Environment, Food and Rural Affairs (Defra), who were involved in the selection of Professor Bateson as Chair.

In order to inform its deliberations and eventual conclusions, the Inquiry team would like to see evidence from the broadest possible range of interested parties. Anyone with relevant information and data is therefore invited to submit their evidence well before the deadline of 15 May 2009.

The terms of reference for the Inquiry and guidance on the means of submitting evidence are set out at www.dogbreedinginquiry.com

All submissions should be provided in the form set out on the website and sent by e-mail to evidence@dogbreedinginquiry.com to arrive by 15 May at the latest. Supporting information, e.g. scientific papers, data, tables and statistics, should be provided either by attachment to the email or by link to the relevant site.

If submission by email is not possible, please post a hard copy of the form and any supporting evidence (PLUS an electronic copy of the whole submission, including supporting evidence, either on CD-ROM or memory stick) to:
The Secretary
The Independent Inquiry into Dog Breeding,
PO Box 682
CAMBRIDGE
CB1 0LY.

Independent Inquiry into Dog Breeding – Call for Evidence

Name:
Role (if applicable)

Organisation
(if applicable)
Address
Email
Contact telephone no
In order to facilitate analysis of the evidence submitted, it would be helpful if you could respond to the questions set out below. Boxes will expand to permit replies to be entered and supporting material can be attached.

SECTION ONE – EVIDENCE RELATING TO WELFARE ISSUES, SCIENCE AND RESEARCH

1. Do you agree or disagree that specific welfare issues arise from dog-breeding?

2. If you agree, please list below the welfare issues arising from breeding and indicate whether it relates to specific breeds, cross-breeds or non-pedigree dogs.

What proportion of dogs is affected in each category of breed or in non-pedigree dogs? A rough estimate may only be possible, but if a precise figure is available, please give it. In either case please give the source for your evidence.

3. If your evidence relates to genetically transmitted diseases, how are such diseases identified and what measurements are used to assess them?

4. Please provide any evidence you may have of any screening tests, DNA tests or other systems relating to the improvement or elimination of canine diseases that are considered to be genetically inherited. Please identify the nature of the test, the breed/s involved, the organisation/s that have developed the test and the source/s of funding for the development of the test.

5. Are you aware of any other such diseases where no screening tests are available - if so please provide details and suggestions as to how these diseases should be addressed, by whom and how any research and screening developments should be funded.

6. If you have any other evidence or views relating to how future efforts to research and control inherited disease should be led and how these should be paid for, please state what form this might take.

SECTION TWO – EVIDENCE AND PROPOSALS FOR IMPROVEMENTS IN WELFARE STANDARDS

7. The Animal Welfare Act 2006 imposes a duty of care such that:
" a person commits an offence if he does not take such steps as are reasonable in all the circumstances to ensure that the needs of an animal for which he is responsible are met to the extent required by good practice."
And states that " an animals needs shall be taken to include:
a) its need for a suitable environment
b) its need for a suitable diet
c) its need to be able to exhibit normal behaviour patterns
d) any need it has to be housed with, or apart from, other animals, and
e) its need to be protected from pain, suffering, injury and disease."

What are your views about the adequacy of this control to protect the welfare of dogs?

8. What is your view of current breed standards for pedigree dogs? Do you believe that these standards are appropriate to protect the health and welfare of pedigree dogs? Please state your reasons and give the name of the organisation that sets the standards.

9. If you do not believe that current breed standards are appropriate to protect the health and welfare of dogs, what action should be taken to limit the prevalence of an inherited abnormality or disease when one has been identified?

10. If you think further action is necessary to protect the health and welfare of dogs bred in the UK, how should this achieved?
Options which have been proposed include: (please mark with a cross (x) all which you think should apply)
Changes to breed standards
Changes to showing rules
Restrictions on the breeding of specific breeds
Requirements to microchip and record the identities of all pedigree dogs
Re-introduction of dog licensing or registration
Restrictions on the commercial breeding of dogs (say anyone whose dogs sire more than five litters per year or whose bitches in total rear more than five litters per year?
Voluntary guidance for dog-breeders and the purchasing public
Voluntary code of practice governing the breeding of dogs
Statutory code of practice governing the breeding of dogs
New regulations under the Animal Welfare Act
The broadening of limited pedigree gene-pools by the introduction of genotypes from outside the UK and/or by the facilitation of out-crossing with morphologically similar but genetically less closely related breeds.
A publicity campaign to ensure that the public understand the risks associated with inherited disease and/or poor welfare standards in breeding, and demand only puppies bred with high welfare standards

Other please specify below

11. Please explain the reasons for the answers you have given to Q 10, providing supporting information wherever possible and stating, if you think it appropriate, who should be responsible for taking action to improve the welfare of dogs and who should pay for it.

12. Do you believe that in some circumstances the maintenance of breed purity outweighs all welfare considerations? If your answer is "Yes", please give one or more examples.

13. If you wish to make any other points not covered by the questions above, please add them below. These points may relate to aspects of the welfare of dogs other than those that are generated by breeding.

THERE ARE NO PLANS TO PUBLISH ALL THE EVIDENCE RECEIVED, BUT THE INQUIRY TEAM MAY WISH TO QUOTE SOME SPECIFIC EVIDENCE VERBATIM.

Please indicate below if you are content for evidence to be published by deleting as appropriate.

I am/am not content for my evidence to be quoted, in whole or in part, in the Report of the Inquiry.

Signed:

Appendix 6 – Summary of Relevant Legislation

Animal Welfare Act 2006

The most recent and most comprehensive legislation affecting the welfare of companion animals is the Animal Welfare Act 2006, which came into force in England on 6 April 2007.

- The Act covers all vertebrates other than man, but specifically excludes from coverage an animal whilst in its foetal or embryonic form.
- However, the Act also provides a power to make regulations and explicitly states that the Act can be extended to cover an animal "from such earlier stage of its development as may be specified in the regulations".
- The Act creates specific offences in relation to unnecessary suffering, including (section 4 1 b) that a person commits an offence if he "knew or ought reasonably to have known that the act or failure to act" would cause a protected animal to suffer unnecessarily. In determining whether the suffering is unnecessary consideration is given, inter alia, to whether the suffering could reasonably have been avoided or reduced.
- The Act imposes a duty of care such that:

" a person commits an offence if he does not take such steps as are reasonable in all the circumstances to ensure that the needs of an animal for which he is responsible are met to the extent required by good practice."

And states that " an animals needs shall be taken to include:

- its need for a suitable environment
- its need for a suitable diet
- its need to be able to exhibit normal behaviour patterns
- any need it has to be housed with, or apart from, other animals, and
- its need to be protected from pain, suffering, injury and disease."
- The Act creates a power to serve improvement notices.
- Section 12 provides power to make regulations for the purpose of promoting the welfare of animals "or the progeny of such animals" and includes the power to make provision for the establishment of one or more bodies with functions relating to advice about the welfare of animals and to make provision for fees or other charges.
- Section 13 provides power to make regulations that make provision for licensing or registration of activities involving animals, and to repeal specified enactments that also impose such requirements. These include the 1973 Breeding of Dogs Act.
- Section 14 provides for codes of practice that provide practical guidance and makes it clear that failure to comply with a relevant provision of a code may be relied upon as tending to establish liability. It is noted that such Codes need to state what is good practice (e.g. they state what must be done). It is not possible for them to provide advice on what is best practice (e.g. what may be done). This is different from the statutory codes governing the welfare of farmed animals, which were made under different powers.
- A range of enforcement powers are also provided to inspectors and the police including powers of entry, seizure etc.

Sale of Dogs Acts

The 1951 Act regulates the sale of pet animals by imposing controls on pet shops including licensing provisions and conditions for licenses.

The Breeding of Dogs Act 1973, The Breeding of Dogs Act 1991 and The Breeding and Sale of Dogs (Welfare) Act 1999

These Acts require anyone who is in the business of breeding and selling dogs to have a license from the local authority under the 1973 Act as amended by the 1999 Act. The local authority has discretion whether to grant a license and must ensure that the animals will be suitably accommodated, fed, exercised and protected from disease and fire. It is for local authorities, who have extensive powers to check on the standards of health, welfare and accommodation of the animals, to enforce the requirements of the Act. The 1973 Act defined a breeding establishment as any premises where more than 2 bitches are kept for the purpose of breeding for sale.

The 1999 Act amended the definition of a breeding establishment and applies the controls to a person keeping a breeding establishment if, on any premises, they have bitches which between them have a total of 5 litters or more within a period of 12 months. It also provides that bitches are not mated until they are at least one year old and that they give birth to no more than six litters in a lifetime and no more than one litter per year, and puppies are not sold at less than 8 weeks old other than to a keeper of a licensed pet shop. There are also provisions relating to accurate breeding records; for identification for traded dogs; and stiffer penalties, including imprisonment.

In addition, the 1991 Act extended the powers of local authorities to obtain a warrant to enter any premises, excluding a private dwelling house, in which it is believed that a dog breeding business is being carried out. All outbuildings, garages and sheds are open to inspection. Previously local authority inspectors could enter and inspect only premises which were already licensed.

Appendix 7 – Proposal for an Advisory Council on Dog Breeding

Terms of reference

The Advisory Council on Dog Breeding (ACDB) is an independent, non-statutory advisory body established to provide advice to governments and other bodies as appropriate regarding the welfare of dogs.

The Council's terms of reference are as follows:

1. To provide independent, expert advice on methods and priorities for improving the welfare of dogs.

2. To provide independent scientific advice on breeding strategies designed:
i) to reduce the incidence of specific disorders in specific breeds.

ii) to guide breeders in effectively breeding away from extreme conformations which directly create welfare problems and towards conformations better suited to good health and welfare.

3. To advise on the development of user-friendly tools that will enable breeders to implement scientific breed strategies effectively.

4. To advise Ministers and other bodies as appropriate on research needs.

Composition of the Council

The Council consists of 12 members: 10 selected for their expertise in areas relevant to the welfare of dogs and 2 "lay" members. The "lay" members are selected on the basis of personal experience or expertise which will benefit the working of the council, but have no direct involvement with dog breeding.

All members are appointed to the Council for their personal knowledge and expertise, not as representatives of particular interest groups. Broadly, members should, in total, have knowledge of:

a. the practice of dog breeding
b. quality assurance and enforcement schemes applicable to dog breeding
c. the epidemiology of inherited disorders in dogs
d. the genetics of disorders in dogs
e. small animal veterinary practice
f. dog behaviour and socialisation issues
g. the effective communication to and education of the public with regard to dog welfare

The Council is to be run in accordance with Nolan principles.

Appointments to the Council

The Chairman is appointed by the Secretary of State for Environment, Food and Rural Affairs, following an open competition run in accordance with the rules of the Appointments Commission. In exercising this role the Secretary of State may take advice, as seems appropriate, from the Devolved Administrations and CAWC and from experts.

Members are also appointed following an open competition. The selection panel will consist of experts relevant to the vacancies being filled and include the Chairman.

Resourcing

Based on relevant precedents, we have estimated the annual running costs of the Council at a figure not exceeding £100,000. From discussions with various parties, we believe that this could be found initially from donations and grants, and ultimately from a levy on registrations with an Accreditation Scheme or Schemes.

Appendix 8

THE KENNEL CLUB

Making a difference for dogs

The Kennel Club is the UK's largest organisation devoted to dogs. When originally founded in 1870 its sole concern was to regulate dog shows and trials and later, to register dogs to avoid duplication of a name in the stud book. In the 2008/9 Annual Report its 6 strategic objectives are described as:

a. ensuring that the Kennel Club is the first port of call on all canine matters.
b. recognising the importance of canine health and welfare
c. popularising canine activities focusing on the retention of existing participants and the attraction of new.
d. achieving a widening of the Kennel Club membership base
e. encouraging the development of all those concerned with dogs through education and training
f. encouraging more people to provide input into the Kennel Club's decision making process

Its Mission statement is: "to raise the relevance of the Kennel Club in the eyes of the public at large, dog owners and those who take part in canine activities so as to be better able to promote in every way the general improvement of dogs."

The Club provides a voluntary register for all dogs, cross bred or pedigree, operates an Accredited Breeders Scheme, runs Crufts and licenses around 3045 dog shows a year. Through its Charitable Trust it invests in scientific research to aid the development of health testing for dogs, and works with the BVA on eye testing and hip screening programmes.

It is a private club. Membership is restricted to a maximum of 1500 UK members plus 50 overseas members and a small number of Honorary and Honorary Life members. Candidates for membership must either be proposed and seconded by current members, or be a self nominated associate of more than 5 years standing. In both instances, the final election of members is vested in the General Committee by ballot.

The Club is governed by the General Committee, chaired by the current Chairman of the Club. The detailed work of the Club is undertaken by a series of subcommittees as follows: Show Executive, Judges, Breed standards and stud book, Disciplinary, Finance and General Purposes, Crufts, Club, Field Trials, Young Kennel Club, KC/BSAVA Scientific Advisory Group

The Scientific Advisory Group is notable for including among its membership a number of scientists and specialists who are not Kennel Club members nor representatives of breed clubs, but are appointed by virtue of their personal expertise.

Through the various services it provides and their penetration into many levels of dog breeding, its control over Championship dog shows and by virtue of the investment it can make in education and science, the Kennel Club wields considerable influence. The governance arrangements are typical of any private members club and adequate to regulate private activities.

Appendix 9

Dogs Trust, formally known as the National Canine Defence League (NCDL), is the UK's largest dog welfare charity, well known for its slogan "A Dog Is For Life, Not Just For Christmas®". The Trust was established in 1891 to protect dogs from cruelty or ill usage of any kind and has long campaigned to improve the welfare of the dog.

Dogs Trust has a network of eighteen Rehoming Centres across the UK and Ireland, which care for over 16,000 dogs every year. They believe that no healthy dog should ever be destroyed and that all dogs should be protected, wanted, suitably homed for life and cared for by responsible owners.

Dogs Trust's mission statement is "Working towards the day when all dogs can enjoy a happy life, free from the threat of unnecessary destruction". The charity has a no kill policy and will never put a healthy dog to sleep. Dogs that cannot be rehomed will always have a home at their Rehoming Centres.

Dogs Trust also invests in education and the promotion of responsible dog ownership, through free or reduced price offers to those owners on means tested benefits. Since 1997 they have microchipped over 230,000 dogs and neutered over 320,000. Their regional Education Officers visit schools and youth groups across the UK and have run over 2,200 workshops, reaching around 211,000 children and young people since 2003.

The charity also works internationally to promote dog welfare issues through the International Companion Animal Welfare Conference (ICAWC) and projects in Malta and Romania.

Dogs Trust provides a link between MPs and responsible dog owners, representing the interests of all dogs. They run political campaigns to influence legislation in the interest of animal welfare such as Compulsory Microchipping and Greyhound Welfare.

The charity is secretariat of the Greyhound Forum, Vice Chair of the Pet Advisory Committee, a member of the Dangerous Dog Forum, Associate Parliamentary Group for Animal Welfare as well as the Pet Advertising Advisory Group.

Over 650,000 supporters and 23,700 members are in regular contact with the charity and their website receives over 10,000 visits a day. Social media sites are also used to contact dog lovers. The Dogs Trust income of over £51m pa is largely derived from donations and legacies. In 2008 they rehomed 12,301 dogs and subsidised the neutering of 51,793.

Dogs Trust does not receive Government funding and is governed by a board of Trustees, chaired by Mr Philip Daubeny. Dogs Trust Chief Executive is Clarissa Baldwin OBE.

Appendix 10 - Glossary

allele A gene on one strand of a chromosome, usually paired with a gene on the complementary autosomal strand. Many alternative alleles can occur at at any one site.

analgesics Pharmacological agents used for reducing the level of pain.

artificial selection The intentional breeding for certain traits, or combination of traits.

autosomal recessive disorders The ill effects caused when an organism inherits two deleterious copies of a gene.

brachycephalic Facial skeleton is short relative to the cranial cavity.

chromosome The structures inside the nucleus of a cell on which alleles are carried and usually arranged in pairs. The number varies between species. The dog has 78 autosomal chromosomes and 2 sexual chromosomes. In mammals the male has a single sexual chromosome (Y) and the female has two sexual chromosomes (XX).

coefficient of relationship *(r)* the level of genetic similarity between two individuals.

coefficient of inbreeding *(F)* The probability that at a given locus an individual receives two alleles that are identical by descent, i.e., inherited from a common ancestor. The value of *F* is half that of *r*.

cognitive bias the extent to which an animal will take risks.

Deoxyribonucleic acid (DNA) The main constituent of chromosomes and the molecular carrier of hereditary information.

effective population size The number of breeding individuals in an idealized population that would show the same amount of inbreeding as the population under consideration.

estimated breeding value (EBV) Relative genetic value of each member of a breeding population.

ethology The biological study of behaviour.

feral dog One that has escaped from domestication and returned, partly or wholly, to a wild state.

founder effect The alleles remaining in a population after a genetic bottleneck when a small group becomes reproductively separated from the main population – such as by the closure of a breed registry.

genetic bottleneck A restriction in the number of alleles when a population is reduced to a small number.

genetic drift The random loss of alleles, particularly marked in small populations

genotype The hereditary information of the organism carried on strands of DNA

heritability The degree to which a character of members of a population is inherited. It does not refer to the characters of any one individual.

heterozygous An organism is heterozygous when two different versions occupy the same locus on complementary chromosomes.

homozygous An organism is homozygous for a pair of alleles when the same version occupies the same locus on complementary chromosomes.

imprinting Learning occurring at a particular age or a particular life stage that is rapid and may have lifetime consequences on behaviour. Not to be confused with “genomic imprinting”.

inbreeding Breeding between close relatives.

microchip A tiny transponder inserted under the skin carrying a unique identifier of the animal and readable from outside the animal.

mitochondrion An organelle within each cell of the body carrying its own DNA which is inherited through the female line.

natural selection The process by which heritable traits that make it more likely for an organism to survive and successfully reproduce become more common in a population over successive generations.

pedigree dog A pure bred dog whose line of descent is recorded over a number of generations.

phenotype Any observable characteristic or trait of an organism: such as its shape, appearance or behaviour. Phenotypes result from the expression of an organism's genes (genotype) as well as the influence of environmental factors and interactions between the two.

polygenic disorders The ill effects of two or more genes.

puppy farm The large-scale commercial breeding of puppies for sale (often used pejoratively).

socialisation The process by which an animal becomes attached to another animal which may not be of the same species.

somatosensory cortex Part of the brain which receives and processes information from the sense of touch.

stereotypies Repetitive, sometimes abnormal behaviour patterns. Examples in dogs would include tail chasing and spinning on the spot.

Appendix 11- Acronyms

ABS	Accredited Breeder Scheme
AHT	Animal Health Trust
APGAW	Associate Parliamentary Group on Animal Welfare
AWA	Animal Welfare Act 2006
BA	Batchelor of Arts
BBSRC	Biotechnology and Biological Sciences Research Council
BSAVA	British Small Animal Veterinary Association
BSc	Batchelor of Science
BVA	British Veterinary Association
BVetMed	Batchelor of Veterinary Medicine
BVMS	Batchelor of Veterinary Medicine and Surgery
CAWC	Companion Animal Welfare Council
CLAD	Canine Leucocyte Adhesion Deficiency
CVO	Chief Veterinary Officer
Defra	Department for the Environment, Food and Rural Affairs
DNA	Deoxyribonucleic acid
DT	Dogs Trust
EBVs	Estimated Breeding Values
FRCVS	Fellow of the Royal College of Veterinary Surgeons
FCIPD	Fellow of the Chartered Institute of Personnel and Development.
FRS	Fellow of the Royal Society
KC	Kennel Club
LACORS	The Local Authorities Coordinators of Regulatory Services
MA	Master of Arts
MRCVS	Member of the Royal College of Veterinary Surgeons
MVD	Mitral Valve Disease
PDSA	People's Dispensary for Sick Animals
PhD	Doctor of Philosophy
RCVS	Royal College of Veterinary Surgeons
RSPCA	Royal Society for the Prevention of Cruelty to Animals
RVC	Royal Veterinary College
ScD	Doctor of Science
UKAS	The United Kingdom Accreditation Service
UFAW	Universities Federation for Animal Welfare
ZSL	Zoological Society of London