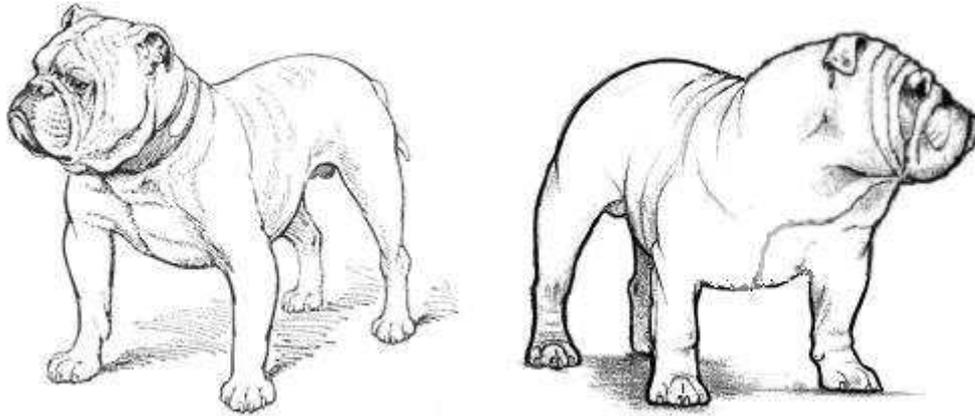


*FROM PERFECTION
TO
PATHETIC PATHOLOGY
IN 100 YEARS -*



Perfect English bulldog interpretations a century ago and currently. Perfection to pathetically pathological in just 100-years.

*PEDIGREE CONFORMATION
SHOW-DOG-BREEDING
IN SOUTH AFRICA:*

*A Literature Review of
Evidence-Based Health
and Welfare Concerns,
with Special Reference
to the English Bulldog*

*By STUART THOMSON
Director, Gaia Research Institute
Knysna*

1st Edition, April 2010

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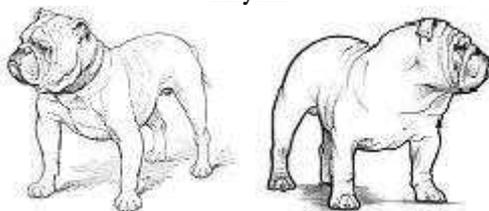
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INTRODUCTION

Thank you for taking time to peruse this report, which I expect you will find shocking.

I have only owned three English bulldogs over the last seven years, two of which are registered pedigreed examples of the breed, and whilst due to the grace of God, are healthier than most compared with what I have observed at bulldog conformation shows and countless photographs from such events over the years, these observations have nevertheless collectively borne witness to the dire straits in which the modern English bulldog finds itself at the wicked hands of Man, but at absolutely no fault of its own.

The reader can access my own website at www.gaiaresearch.co.za/bygoneshulldogs.html for more information, but the current report deals exclusively with the peer-reviewed scientific evidence-based crisis facing registered closed-studbook bred pedigreed dogs as administered by the Kennel Union of South Africa (KUSA) and their apparent inability to grasp the seriousness of the situation and act in the best health and welfare interests of the dogs themselves rather than the financially vested interests of their breeder members and the income- and position-generating institution that is the Kennel Union.

What follows is a chronological literature review of the milestone research conducted into this topic over the last 70-years, much, if not all of which appears to have escaped the breeder's, veterinarian's and administrator's attention all this time, or alternatively has been deliberately ignored so as to not have to face the shocking truth of this continuing tragedy and so upset the cosy status quo of their smug ego comfort zones. I have allowed for repetition, so as to indicate the occurrence and strength of consensus. I end on page 26 with simply irresistible castigation of a few noted worming individuals.

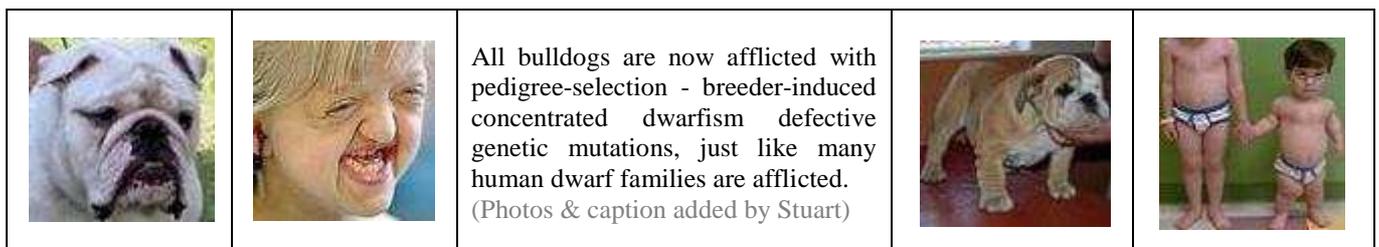
I have and continue to call for the suspension of all awarding of breeders of such dogs until the amended standards are adopted and implemented with training of new judges not previously associated with what is violation of the rights of all affected dogs this last century to the present. I for one shall, on principle, refrain from entering my dogs until the new dispensation is enforced. I caution the KUSA and by implication, judges and show awardees, of their continuing culpability, and the KUSA in particular, of legitimate claims for damages. Breeders and owners of English bulldogs are entitled to have their dogs judged by the official national country standard of the breed and as long as the KUSA delay and so prevent this from taking place, such dogs and owners are prejudiced.

Chronological Review of the Peer-Reviewed Published Scientific Literature, with Commentary

Dr Charles Stockard (BS, MS, PhD, MD), Professor of Anatomy, Head, Dept of Anatomy and Director of the Anatomical Laboratories and the Experimental Morphology Farm at Cornell University Medical College, New York, where he cross-bred hundreds of dogs to study the inheritance of morphological characters, was likely the first to study the genetic basis of the morphological exaggerations and resultant disease conditions in **English bulldogs**.

In his nearly 800-page manuscript documenting this pioneering research over a decade, incomplete at his death, but prepared for publication by the Wistar Institute of Anatomy and Biology, with 128 text figures and 113 photographic plates, **Dr Stockard** comparatively mentions the bulldog's shortened head and shorter legs and short, bent and "deformed" screw-tail" and then more serious anatomical limitations, where he stated: "**The jaws are powerful and wolf-like in most dog breeds, but in the bulldog are deformed and poorly suited for biting. In most breeds the teeth are splendidly set and strongly developed, but in bulldogs, they are ill-set and poorly developed**". (Stockard C, 'The genetic and endocrine basis for differences in form and behaviour as elucidated by studies of contrasted pure-line dog breeds and their hybrids, Am Anat Mem, No. 19, 1941)

Regarding the bulldog achondroplastic skull; its modified growth and deformed development, **Dr Stockard** stated: "**The modified achondroplastic head of the prize bulldog is a character depending upon the homozygous condition of several genetic factors for its complete expression. The human stocky dwarf is also round headed or brachycephalic. The nose bridge is flat and the palatal region shortened, causing the mandible to protrude beyond the upper jaw and producing the so-called undershot condition. The face is characteristically wide and flat with sunken nasion, making the appearance commonly termed 'dish-faced'**". Such a physiognomy is comparable in every detail to the face of the **bulldog**. The coccygeal vertebrae are fused and bent in direction in some human dwarfs and resemble the like condition in the **bulldogs**". (Stockard C, Am Anat Mem, No. 19, 1941)



Of great historical scientific significance is that **Dr Stockard** pointed out that in discussing the origin of dog breeds, "**Charles Darwin** stated more clearly than in any other connection, his ideas of the possible origin of species, through mutations, use-inheritance and selection". **Dr Stockard quotes Darwin** as stating: "**Some of the peculiarities characteristic of the several breeds of dog have arisen suddenly, and, though strictly inherited, may be called 'monstrosities'; for instance, the shape of the head and the under-hanging jaw in the bulldog. A peculiarity suddenly arising, and deserving to be called a 'monstrosity', may be increased and fixed by man's selection**". (Charles Darwin, 'The Variation of Animals and Plants under Domestication', Vol. 1, Lond, 1875); (Stockard, 1941)

Dr Stockard, referring to **Darwin's insights** further stated: "**In the absence of modern knowledge of mutations and the mechanism of inheritance, this statement of 60 years ago is remarkable. The origin and inheritance of the head of the bulldog is keenly correct. We cannot explain by crossing the origin of such extreme forms as thoroughbred bulldogs unless we believe that forms characterized once existed in nature. But hardly anyone has been bold enough to suppose this. It seems to have originated from the Mastiff and it is highly probable that it existed before 1630, though then of much larger size. We shall find much evidence to indicate that careful selection of numerous mutations was necessary in the development of the present day English bulldog**". (Stockard C, 1941)

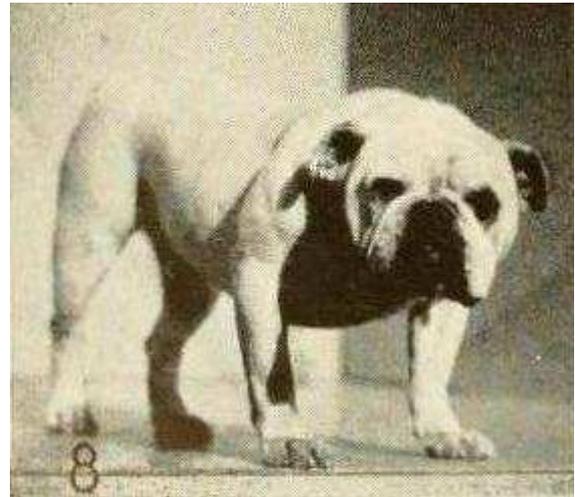
Dr Stockard stated: "**The animal used for bull-baiting and dog fighting a century ago in England was far less deformed than our present day bulldog in which the mouth and teeth are so defective as to make its biting ability very poor. The English bulldog has characteristically extreme distortions in the growth patterns of the head, body and tail, and certain defective conditions in the skeleton of the appendages. The earliest bulldogs were not so grossly deformed as the present day animals but were more mastiff-like in character. The bulldog was originally derived from a series of mutations which gave rise to structural deviations, passing through a stocky mastiff type and from this to the more highly modified bulldog through the addition of later mutations**". (Stockard)

When **Dr Stockard** discussed 'Achondroplasia of the Extremities', he referred to "the growth of the extremities and the quality of the leg bone, both structurally and genetically", but only to the "extremely short and deformed legs of the Dachshund and the Basset hound breeds". The lines of Dr Stockard's pedigreed and champion bulldogs of that period were such that many still had relatively long legs when he acquired his stock in the late 1920's (see photos) and to which offspring he accordingly correctly described, relative in comparison to the aforementioned breeds thus: "**The English bulldog has short and stocky but straight non-achondroplastic legs**". (Stockard, 1941)

“The earliest bulldogs were not so grossly deformed as the present day animals.”

Dr Stockard stated: “The legs of the **English bulldog** are short and sturdy and the front legs are set far apart, making the chest appear extremely wide and giving rise to the term ‘bench-legged’. Figure 1 (below) in is a good illustration of this condition in the legs of a highly prized champion specimen, used in these experiments as a sire. The legs are perfectly straight boned and show no evidence of twist in growth and no overhang at the wrist or abduction of the foot. In other words, there is no evidence of achondroplastic growth in the long bones of the extremities in the **bulldog**. This fact is of great interest since the skull, tail and at times other regions of the axial skeleton show the most exaggerated conditions resulting from pronounced chondrodystrophy”. (Stockard C, 1941)

Clearly Dr Stockard was not privy to the show-circuit fashion trends and given that his conclusions were formulated in the late 1930’s, he can be excused for broadly extrapolating from his sound bulldog stock to showdogs generally. [I have extracted Figure 1 from Plate 18 (page 93) & Figure 8 from Plate 1 (p41) to illustrate their nice long legs]



Some actual pedigreed bulldogs studied by Dr Stockard. His champion sire is on the left and a typical female is on the right.

Note the longer bodies, longer legs and smaller heads than modern exhibits. Significantly these are relatively disease - free.

Dr Stockard did however state: “We must make some qualification in the statement that chondrodystrophy in the **bulldog** is strictly confined to the axial skeleton. *The cartilage growth in both the pectoral and pelvic girdles is affected. The labial cartilages of the glenoid fossa on the scapula and of the acetabular fossa of the pelvic bones are somewhat deficient, causing the fossae to be abnormally shallow. In such cases the heads of the humerus and the femur may be dislocated from the shallow sockets.* This occurrence is not rare in the **bulldog** but as a rule the sockets are sufficiently deep to prevent easy luxation. The skeletons of adult bulldogs sometime show dislocation of the shoulder or hip joint that was not apparent in the living animals”. (Stockard C, *Am Anat Mem, No. 19, 1941*) A review of the bulldog veterinary literature today documents a very serious deterioration of this sad state of affairs.

Clearly, as conformation and especially line breeders selected for ever shorter legs, these defects were amplified. Dr Stockard clearly foresaw the potential for achondroplastic legs in bulldogs, since he rather unambiguously stated: “*We have much evidence that short and stocky bone is more completely affected in the presence of the achondroplasia leg gene than is the long, slender type of bone. The heterozygous state of a single factor dominant for short achondroplastic legs exerts a considerably greater effect when acting on the bulldog constitution than does even the homozygous double gene for this dominant expression when acting on other severely affected breeds. The influence of the factor for leg achondroplasia differs in degree of severity depending upon the bone constitution of the breed concerned. The bulldog bone gives the most pronounced response.*” (Stockard C)

“The influence of the factor for leg achondroplasia differs in degree of severity depending upon the bone constitution of the breed concerned. The bulldog bone gives the most pronounced response.”

PLATE 20

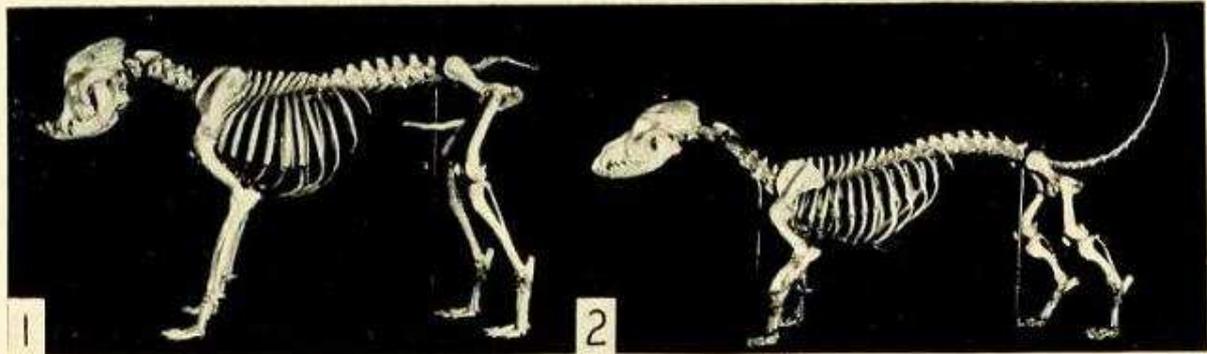
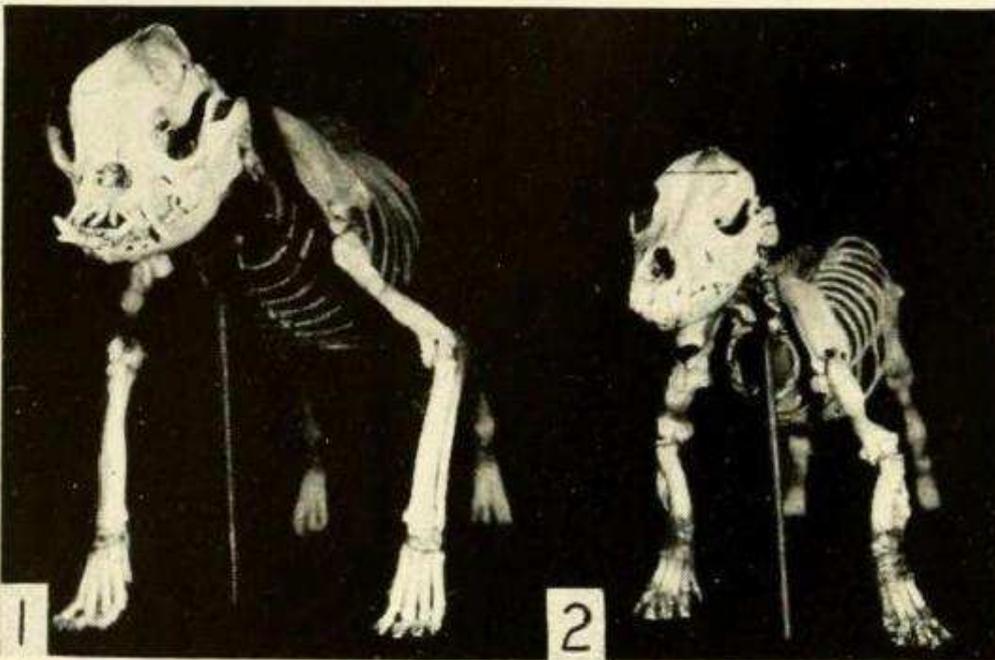


PLATE 21

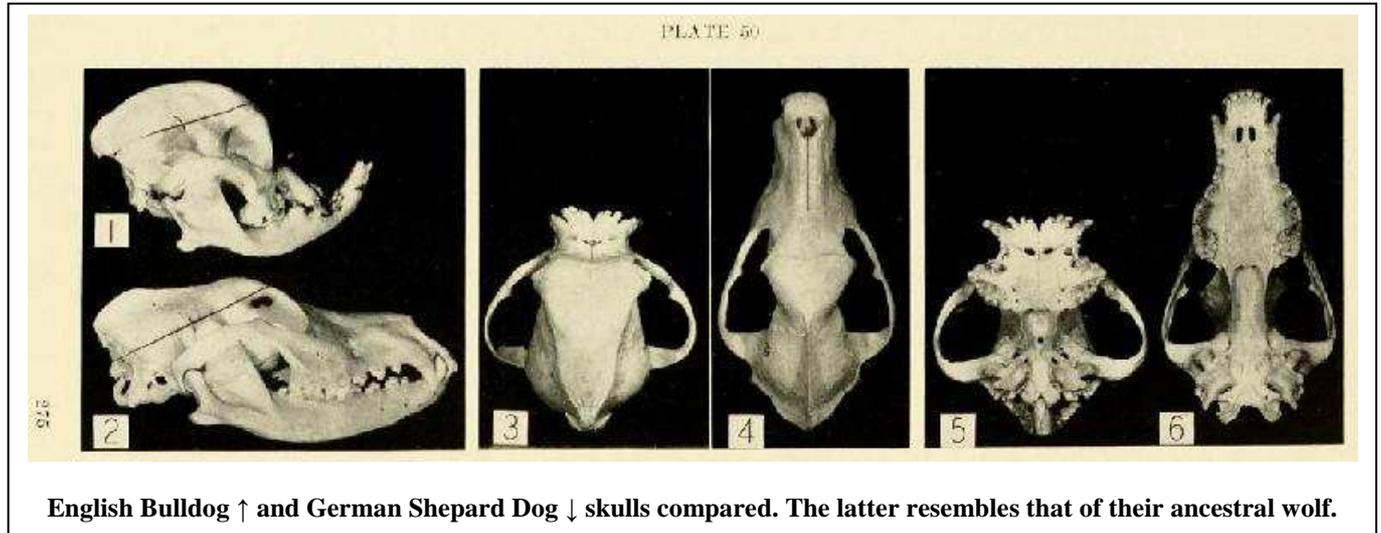


Skeletons of 1920's pedigree English bulldog and pedigree Basset hound compared for achondroplasia. This longer, more slender bone legged bulldog is relatively free of this crippling Basset hound defect. Unfortunately, the modern bulldog's short legs now more closely resemble those of the crippled Basset.

Note: Achondroplasia is a "birth defect" because the syndrome of this disorder is present at birth. Onset is in fetal life. Familial achondroplasia is inherited as an autosomal-dominant gene. It is a failure disorder of the growth of cartilage in the epiphyses of the long bones and skull. It results in premature ossification, permanent limitation of skeletal development, and dwarfism typified by a protruding forehead and short-limbed dystrophy characterized by upper arms and thighs that are disproportionately smaller than forearms and legs. Features include: bowing of extremities, waddling gait, limited range of movement of major joints. Prognathism may occur. (*Saunders Comprehensive Veterinary Dictionary, 3rd edn, Elsevier 2007*); (*Mosby's Medical Dictionary, 8th edn, Elsevier, 2009*)

In Section III, **Dr Stockard**, with contributions by **Dr A. L. Johnson**, discuss 'The **Bulldog Achondroplasia Skull**; Its Modified Growth and Development' and state: ***"The bulldog typed skull is not confined to the dog species alone. A closely comparable type of skull modification appears man himself. The bulldog-like depression of the face and protrusion of the lower jaw as found in the human race is usually confined to short, stocky, dwarfed persons with abnormally shortened extremities. The behavior of such persons is stolid and deliberate and the more intelligent among them, strongly determined in their actions"***. (*Stockard, 1941*)

Dr Stockard stated: ***“Bulldog skulls are very abnormal and highly aberrant in form, with pronounced structural disharmonies. The English bulldog possesses an extremely shortened skull with a prognathous lower jaw and an abbreviated muzzle with extremely shortened maxillary and nasal regions. Three different aspects of the German Shepard Dog skull photographed with comparable views of the English bulldog skull are shown in Plate 50 (below). The Shepherd skull is in all aspects closely reminiscent of the skull of the wolf. If these two skulls were found as fossils, a paleontologist would hesitate to class them as belonging to any one family of Carnivora”.***



Dr Stockard stated: ***“Bulldogs show localized chondrodystrophy deformities at both the head and tail ends of the axial skeleton, both distortions in cartilage growth. The epiphyseal cartilages in the tail vertebrae of the bulldog fetus are so dystrophic that the entire tail is deformed into a corkscrew-like twist, and shortened to a few centimeters in length. The fusion and shortening of caudal vertebrae bringing about a reduction in tail length is separated genetically from the vertebrae deformity that produces bending and twisting of the tail”.*** (Stockard C, 'The genetic and endocrine basis for differences in form and behaviour: as elucidated by studies of contrasted pure-line dog breeds and their hybrids', *Am Anat Mem*, No. 19, 1941)

Note: My point in providing this early reference and detailed information is to emphasise that these conditions have been long studied and determined to be genetic in origin and hence to have been and remain within the control of breeders. Little of pertinence appears to have been published until the 1960's, so we shall travel forward to then.

It is interesting to note that the 1960's saw the first serious critique of the direction in which showdogs were being led. It brings terrible shame on those involved in pedigree dog breeding and conformation shows that so little was done in ignorance of these concerns over the ensuing five decades and that there remains such an arrogant culture of denial and resistance, in the face of sincere and long-overdue welfare reform of several breed standards. In December 1962, 'The Canadian Journal of Comparative Medicine and Veterinary Science' published an article, author(s) **anonymous**, which appeared on 8 February of that year in 'The Field' magazine in London, England.

The author stated: *“Some hard things are said, often in ignorance, about **dog shows and show dogs**. We have aired occasional misgivings about aspects of breeding dogs for the show bench. Where appearance is to be the only ultimate criterion of value, defects may be tolerated if they cannot be detected in the necessarily limited time for examination by a judge in the ring. In the matter of physical failings, the trained observation of the veterinary profession is highly relevant. Vets are not, as a body, biased for or against any particular breeds. Some of their recent statements have been very significant. One of them was reported in a recent issue of 'The Journal of Small Animal Practice'. (Anon. 'When a Vet Should Speak Out', *Can J Comp Med Vet Sci*, 26(12), 1962)*

The author continued: *“An article in this professional publication stated outright that the Executive Committee of the British Small Animal Veterinary Association had become 'very concerned' at the serious increase in the number of pedigree dogs suffering from defects and abnormalities, and by the corresponding increase in requests for surgical correction of these faults. Significantly, the author of the article was **Dr S Hodgman, of the Canine Health Centre, Newmarket**". [The Centre and the associated Animal Health Trust, a veterinary charity dedicated to improving the health and welfare of horses, dogs and cats, are still operational today and specialises in cases too complex to be treated by local veterinarians and require referral to world-class vets. The Centre's clinical and research experts work closely together to benefit not only individual cases, but the veterinary profession as a whole, internationally]*

The author continued: “*Dr Hodgman’s central point was that there is strong evidence that many of these conditions are hereditary. The present situation may have arisen because of the ignorance of many dog breeders of elementary genetics. Irrespective of the causes, the alarming fact remains that the percentage of unsound stock is on the increase. The object is to underline Dr. Hodgman’s warning of the growing unintentional encouragement of the depreciation of pedigree blood-lines. As a distinguished vet, Dr. Hodgman has frankly told his colleagues that a veterinary surgeon owes a duty to his clients that goes beyond the treatment of individual animals.*” (Anon, 1962)

The author continued: “*Breeding from defective animals not only destroys bloodlines, but discredits a breed both at home and overseas. Unfortunately, this warning sometimes falls on deaf ears. It is a great temptation to the owners of a champion to disregard or deny any defects that are repeated in its offspring. Their natural inclination is to keep quiet about the matter. There is no suggestion that dog breeders and exhibitors are deliberately dishonest. Their worst faults are ignorance and a disinclination to face up to unpleasant facts.*” (Anon. ‘When a Vet Should Speak Out’, *Can J Comp Med Vet Sci*, 26(12), 1962)

Dr Hodgson referred to above was a core founding member of the British Small Animal Veterinary Association in 1957 and amongst his many accolades was in 1961 being awarded (as Colonel) ‘The Victory Medal of the Central Veterinary Society’, the oldest veterinary society in England, which is awarded to a person who has rendered outstanding service either to the Society or to veterinary science in general. Sir David Attenborough, CVO, CH, CBE, FRS, was awarded the medal in 1996. Dr S J F Hodgman was author of many landmark animal welfare publications in the early 1960’s that focused on hereditary canine defects. (Hodgman S, ‘*The duties of veterinary surgeons in attendance at championship dog shows*’, *Brit Vet J*, 117(5), 1961); (Hodgman S, ‘*Abnormalities in pedigree dogs: Their surgical correction, related to Kennel Club Rules and Regulations*’, *J Small Anim Pract*, 2 (1-4), 1961); (Hodgman S, ‘*Abnormalities of possible hereditary origin in dogs*’, *Vet Rec*, 74(46), 1962)

Dr Hodgman (MRCVS) stated: “*The preliminary results of an investigation into the existence of certain deleterious conditions that are hereditary are presented. Thirteen conditions found to be of major concern and of these five were considered to be of importance and needing immediate consideration are hip dysplasia, patella luxation, entropion, retinal atrophy, and prolonged soft palate. The second priority group consists of abnormal temperament, skin fold dermatitis, uterine inertia, elbow dysplasia, ectropion, trichiasis, and deafness.*” (Hodgman S, ‘*Abnormalities and defects in pedigree dogs: I, An investigation into the existence of abnormalities in pedigree dogs in the British Isles*’, *J Small Anim Pract*, 4(6) 1963) Most of these pertain to the English **bulldog!**

Dr Oliver Graham-Jones (FRCVS), first resident veterinarian at London Zoo (Regent’s Park) where he had a successful 16-year tenure following his appointment as curator of mammals and veterinary officer to the Zoological Society of London in 1951, and was also personal veterinarian to the British Prime Minister, Sir Winston Churchill. In 1961, he was instrumental in the formation of the British Veterinary Zoological Association and in 1962, was President of the British Small Animal Veterinary Association. In 1966 he returned to his Alma Mater, the Royal Veterinary College as lecturer and clinical tutor and took charge of the Beaumont Animal Hospital until his retirement in 1979, whereupon in 1980 he was a recipient of the Sir Arthur Keith Medal for his contributions to medical research and to the development of co-operation between the medical and veterinary professions.

During his opening address to the 6th BSAVA Congress, **Dr Oliver Graham-Jones** announced: “*We have recently been to the House of Commons on your behalf and met many members of both Houses. We told them of our tremendous interest in the abnormalities of some of the dogs that we are called upon to treat; and explained that our concern is that dogs are being bred and born into this world to suffer throughout their lives from certain conditions which probably could be prevented.*” (Graham-Jones O, *J Small Anim Pract*, 4(6), 413-414, 1963) At the parallel BSAVA symposium, nearly 5-decades ago, themed ‘**Abnormalities and defects in pedigree dogs**’, to address concerns about inappropriate breed standards and inherited disorders in pedigree dogs, six papers were presented, that, with a general discussion, were published in the *Journal of Small Animal Practice* that year.

(Hodgman S, ‘*Abnormalities and Defects in Pedigree Dogs—I. An Investigation into Dogs in the British Isles*’);
(Hein H, ‘*Abnormalities and Defects in Pedigree Dogs—II. Hereditary Aspects of Hip Dysplasia*’);
(Knight G, ‘*Abnormalities and Defects in Pedigree Dogs—III. Tibio-Femoral Joint Deformity & Patella Luxation*’);
(Barnett K, ‘*Abnormalities and Defects in Pedigree Dogs—IV. Progressive Retinal Atrophy*’);
(Willis M, ‘*Abnormalities and Defects in Pedigree Dogs—V. Cryptorchidism*’);
(Frankling E, ‘*Abnormalities and Defects in Pedigree Dogs—VI. The Breeders’ Point of View*’).

(As above, ‘*Abnormalities and Defects in Pedigree Dogs—I-VI, J Small Anim Pract*, 4(6), 447-478, Dec. 1963)



Ancient and contemporary bulldog skulls compared to illustrate how breeders have altered skull and jaw in 300 years. The concentrated repetition of aberrant mutations of the cranium and 'upper' jaw (maxilla) has resulted in this defect.

Dr Michael Fox (BVet Med), a pioneer in animal welfare, left England after attending the Royal Veterinary College, and interning as House Surgeon at the Cambridge School of Veterinary Medicine. While at the Jackson Laboratory, Bar Harbor, Maine, USA, as a Fellow and Staff Scientist, Dr Fox stated: **“Brachygnathism (Bulldog head) (title) The excess of soft tissue in proportion to the size of the upper jaw and facial (brachyfacial) area may cause a variety of clinical conditions”**. [Note: Figure 1.d. consisted of a photograph (of poor quality compared to today's digital publishing standards) of a typical bulldog skull (see the image above) with drastically shortened upper jaw] (Fox M, 'Developmental Abnormalities of the Canine Skull', *Can J Comp Med Vet Sci*, 27(9), 1963)

Dr Fox stated: **“Brachygnathism (Fig. 1 Bulldog skull) Although this condition may arise spontaneously in mesocephalic breeds, it is maintained as a breed characteristic in the brachycephalic (bulldog) type, and secondary abnormalities of soft tissues are often associated with this condition. Due to extreme reduction of the maxillary region, abnormal development of the nasal alae and turbinate bones may occur with subsequent respiratory dyspnoea. Secondary laryngeal collapse has been reported in relation to these conditions. Oversize of the tongue may occur, although the tongue would fit a skull of normal maxillary proportions; this then may be relative oversize of the tongue, which may be protruded continually and has been mistaken for hypoglossal paralysis”**. (Fox M, 'Developmental Abnormalities of the Canine Skull', *Can J Comp Med Vet Sci*, 1963)

Dr Fox stated: **“Elongation of the soft palate is a common anomaly in brachyfacial breeds and contributes to respiratory embarrassment, heat stroke, laryngeal collapse, and the reverse sneeze syndrome. This disproportionate size of soft tissue may be absolute oversize. Some brachycephalics have fairly normal skull soft tissue proportions while in others the amount of soft tissue greatly exceeds the skull proportions. Dermatitis of the skin folds is common in these breeds where excessive facial skin forms corrugations and pyotraumatic dermatitis develops. Cleft palate and harelip, seen either singly or concomitantly, are commonly seen in brachycephalic breeds”**. (Fox M, 'Developmental Abnormalities of the Canine Skull', 1963)

Dr Fox stated: **“The higher incidence of neoplasia in brachycephalic dogs may be related to reduction in cranial capacity in proportion to brain volume and pressure changes are less easily compensated in the brachygnathic breeds. The shape of the cranium in the brachycephalic may in part account for the high incidence of tumors in these breeds. With reduction of the anterior (maxillary) part of the skull and compression of the frontal region into an almost vertical position, it is possible that alterations in intracranial pressure produce more dramatic symptoms than in meso- and dolichocephalic breeds. A cone of pressure is built up by the tumor and compensatory shifting of the brain may not occur so that symptoms are more frequently seen in these breeds and neoplasia of the CNS more frequently diagnosed clinically than other breeds. (Fox M, 1963)**

Dr Fox concluded: **“The impression that brachycephalic dogs more frequently develop CNS tumors may be only partially correct, because normally asymptomatic lesions, by virtue of the shape of the cranium, cause greater increases in intracranial pressure. In the canine cranium there is only limited opportunity for shift of the brain stem in a rostro-caudal direction for the cranium is small and the tentorium cerebelli is bony and rigid, but brain stem displacement due to tumor pressure occurs especially laterally and dorsally. Pressure changes may be less readily compensated therefore in the brachycephalic where there is additional structural compression of the frontal bones and reduction of the rostral space. Secondary internal hydrocephalus may develop more easily under such circumstances”**. (Fox M, 'Developmental Abnormalities of the Canine Skull', *Can J Comp Med Vet Sci*, 27(9), 1963)

Dr Fox went on to publish a valuable service to the field, titled (*'Diseases of Possible Hereditary Origin in the Dog: A Bibliographic Review'*, *J Hered*, 56(4), 1965), and later **Dr Michael Fox** (DSc, PhD, DVM, BVet Med), then a researcher at Washington University, Missouri, USA, in reviewing various abnormal conditions and their breed incidence and mode of inheritance in dogs, in 1970 listed three examples of susceptibilities for the **Bulldog**: the skeletal anomaly - Achondroplasia (chondrodystrophia fetalis); the soft-tissue anomaly - Prolongation of soft palate & laryngeal collapse; and endocrine disturbance - Goitre (*Fox M, Developments in Veterinary Science: 'Inherited Structural and Functional Abnormalities in the Dog'*, *Washington University, Missouri, Can Vet J*, 11(1), 1970).

Dr Fox, now Professor of Veterinary Bioethics and Vice President of the Humane Society, USA and International stated: ***"Purebred dogs have fundamental genetic defects. These defects can result in lifelong suffering, sickness, and physical handicap – what I have termed 'domestogenic' diseases, diseases inflicted upon animals by humans. Certain handicaps may be 'deliberately created' by selective breeding and become breed 'standards' in purebred dogs. The pushed-in (brachycephalic) face of the bulldog is a dramatic example. Their protruding eyes and facial skin folds easily become infected. The bulldog's disproportionately large soft palate sets up a negative pressure so that the animal's windpipe may actually constrict, or even collapse, and the bulldog is partially and chronically or suddenly completely asphyxiated"***. (*Michael W. Fox, Inhumane Society, St Martins, NY, 1990*)

Dr Roy Robinson (FIBiol), animal geneticist at St Stephens Road Nursery, London, back in the early 1980's stated: ***"The 20th century advent of the dog show could mean the end of the evolutionary road for the species"***. (*Roy Robinson, 'Genetics for Dog Breeders', Pergamon Press, 1982*)

Dr Malcolm Willis (BSc, PhD), geneticist and senior Lecturer in Animal Breeding and Genetics at the University of Newcastle upon Tyne, stated: ***"Standards drawn up by men as to what a particular breed should look like and breeding directed towards producing this ideal has not always been logical in a biological sense"***. (*Willis M, 'Breeding dogs for desirable traits', J Small Anim Pract*, 28(11), 1987) Some of Dr Willis' many published works include: (*Malcolm Willis, 'Genetics of the Dog', H F & G Witherby Ltd, 1989*); and (*Malcolm Willis, 'Practical Genetics for Dog Breeders', H F & G Witherby Ltd, 1992*). Dr Willis was awarded Honorary Associateship by the Royal College of Veterinary Surgeons in 1996, the highest honour the RCVS can bestow upon a non-veterinarian.

Dr Brian Wilcock (DVM, MSc, PhD), is Professor Emeritus in the Department of Pathology at Ontario Veterinary College, University of Guelph, Ontario, Canada and was the first Visiting Professor invited to the Atlantic Veterinary College and also the D.L.T. Smith Visiting Scientist at the Western College of Veterinary Medicine. Dr Wilcock's published works include (*Pathology of Domestic Animals - Beth A. Valentine, Brian P. Wilcock, Joanne E. Mansell, Elsevier Science, 5th Edn, 2007*) and his awards include, in 1999, the Award of Merit from the Ontario Veterinary Medical Association in recognition of 'distinguished public service to the profession of veterinary medicine'.

Dr Wilcock, 20-years ago stated: ***"Purebred dogs are in big trouble. The trouble is genetic disease in all its disguises, ranging from obvious inherited errors of structure of function to those problems that are more vaguely recognized as familial, breed-associated or even just body type associated that may have complex causations that are only partly genetic. We have done so little about these tragically pervasive problems because of our shared ignorance about the extent of the problem, and because the solution is not found in a vaccine vial, pill bottle or surgical pack"***. (*Wilcock B, Opinion, 'The genetic crisis in purebred dogs', Can Vet J*, 31(4), 1990)

Dr Wilcock stated: ***"Most of us are poorly equipped to give advice about the investigation and management of genetic disease and are perhaps not inclined to acquire the necessary competence because it is not economically valid expenditure of our time, or breeders will not heed our advice even if it is sound! The uneasy relationship between dog breeders and veterinarians is a historical reality, to the detriment of the animals both claim to love. This commentary may not change anything, but at least I will feel that I have done something to awaken our collective professional conscience"***. (*Wilcock B, 'The genetic crisis in purebred dogs', Can Vet J*, 31(4), 1990)

Dr Wilcock stated: ***"The very concept of animal breeding is based upon the exploitation of anomalies, the planned manipulation of genetic variation. In no other species do we see the degree of phenotypic exaggeration that is evident among purebred dogs. Unlike the genetic manipulation in most other domestic species that has been guided by some pragmatic, economic goal, the manipulation of the canine genome has, at least in modern times, been guided almost solely by the whims of fashion. For the majority of dogs, there is no penalty for bad design since we ask our pets to do so little, with no utilitarian standards of structure or function at all"*** (*Wilcock B, 1990*)

Dr Wilcock stated: *"It is probably no accident that those breeds that have remained relatively free of genetic disease are those that have not drifted very far from the utilitarian design for which they were originally created, or from the medium-sized, square type that tends to dominate whenever Mother Nature is permitted to run the breeding program. **When we substituted our own selection criteria for those dictated by the laws of survival of the fittest, we neglected to maintain the rigor of our selection process.** All we demand today is that our pets have the structural capability to survive the rigors of urban household life (the sofa-to-bed obstacle course), master the intellectual challenge of house-training, and maintain enough emotional stability to be considered an "acceptable" pet by people who seem prepared to forgive almost any outrageous behavior in their animals!" (Wilcock B, 1990)*

Dr Wilcock stated: *"**We play our part by developing and offering increasingly sophisticated veterinary care to compensate for the anatomical and physiological shortcomings that dog breeders have allowed to evolve. This may seem like a bitter indictment, but how else can you explain the modern version of the English bulldog?** The official breed standards of the Kennel Clubs actually contain words of encouragement for the continued abuse of the canine phenotype. **English bulldogs are required to have a 'muzzle as short as possible' and 'eyes as far from the ears as possible'.** My sense of good taste prevents me from suggesting where the Bulldog's eyes may eventually end up if breeders were to take full advantage of this directive!" (Wilcock, 1990)*

Dr Wilcock stated: *"The problem we face is that genetically-conditioned disease is inherent to the very principle of stabilizing phenotype through '**line-breeding**'. Most of our diseases are somehow linked to what we have come to accept as "normal" for the breed. To eliminate the predilection of specific breeds to specific diseases by deliberately selecting against specific phenotypes, or by instituting a rigorous test-and-cull program for those few disorders for which we have sensitive, specific and early testing, runs the risk of rendering the breed unrecognizable. We probably would create the swiftfooted, free-breathing and caesarian-free **bulldog**, but it may not look anything like the **bulldog** that is so precious to those who have owned and loved one". (Wilcock B, 1990)*

Dr Wilcock concluded: *"Our natural bias is to value health above all else and a selection program designed by veterinarians would value health criteria above all else. We must recognize that people buy purebred dogs because each breed is, in fact, different and has a predictable and reasonably narrow range of physical and behavioral attributes. We will have to reach compromises with breeders, breed clubs and the kennel clubs as to what degree of retrenchment from some of the currently exaggerated phenotype is acceptable. No one plans to produce disease-prone dogs. Few breeders have the knowledge to recognize how changing shape, length or configuration could predispose to disease". (Wilcock B, 'The genetic crisis in purebred dogs', *Can Vet J*, 31(4), 1990)*

Dr Keith Stewart Thomson (BSc, PhD) is a paleozoologist and Professor of Natural History at University of Oxford and Director at the Oxford University Museum of Natural History and has been Adjunct Professor of Geology, University of Pennsylvania; Senior Research Fellow of the American Philosophical Society; President of the Academy of Natural Sciences, Philadelphia; Professor of Biology, Curator of Vertebrate Zoology and Dean of Yale University and Dean and Director of Yale's Peabody Museum of Natural History. His numerous publications include: (Keith Thomson, '*Morphogenesis and Evolution*', Oxford University Press, Oxford, 1988) and (Keith Thomson, '*Before Darwin: Reconciling God and Nature*', Yale University Press, New Haven, Conn, 2007).

Dr Thomson was the first academic to specifically single out and criticise the state of the modern English Bulldog. Eventually I tracked down Dr Thomson to Oxford University, where he is still working at the age of 72 years young. The good Professor graciously scanned and e-mailed me his paper and patiently answered my many questions. I have abstracted and edited responses from my personal communications with Dr Thomson following our contact:

*"Was the inversion to 'Fall and Rise' in the title deliberate?" I enquired. His reply: "It was meant explicitly to highlight attempts to bring back something less deformed than the current standards strive for. The only way to go is up. I suspect you are opening up yourself for instant, mindless, criticism. But it is necessary to publicise how awful the physical condition of show bulldogs really is. What does the South African equivalent of the R.S.P.C.A. say about the ethics of the modern **English bulldog**?" (Keith Thomson, personal communication, 16 February, 2010); "I got a huge mail at the time, most from the USA trying to create a more reasonable bulldog. I wrote as a biologist because I had seen the nineteenth century skulls". (K. Thomson, pers. comm. 5 Feb, 2010); "Glad you got them. We Thomsons have to stick together. Nice dogs." he kindly remarked. (K. Thomson, pers. comm., 3 Feb, 2010)*

Dr Thomson is indeed a man after my own heart - not one to mince his words. In his opening paragraph he stated: *"**The English (British) bulldog breed became a symbol of national courage and fortitude. Today it is merely a dysfunctional lapdog. This history should cause us to reflect not only on the real and symbolic uses to which we put our domestic animals, but also the ethics of their breeding. If ever there were a symbol of former glory that had fallen on hard times, it is the English (British) bulldog. It urgently needs a breeding program that would restore some grace and integrity, let alone dignity, to this very ancient breed.** In England it is an important totemic animal". (Keith Stewart Thomson, '*The Fall and Rise of the English Bulldog*', *American Scientist*, 84(3), May-June, 1996)*

Dr Thomson stated: *“There is an almost voyeuristic fascination in the physical deformities that have been bred into the modern **bulldog** - the severely brachycephalic head, prognathous up-curved mandible, distorted ears and tail. A modern **bulldog**, with its overly short legs, exaggerated broad stance and slow, heavy gait more resembles a veterinary rehabilitation project than a proud symbol of athletic strength or national resolve. Not only is the dog grotesquely disfigured, it is partially handicapped by the insult to its nasal and respiratory apparatus.* Furthermore **bulldog** pups have to be delivered by Caesarian section. Older accounts of the **bulldog** always refer to its strength, but they clearly refer to a different, more athletic animal.” (Keith S. Thomson, *Am Sci*, 84(3), 1996)

Dr Thomson: *“How did it come to its present sorry state of affairs? Of course the answer is breeding for fashion. One only has to compare the **English bulldog** of 1996 with that of 1840 to see how fashion reinforced, or perhaps, led by those arbiters of canine conformation – the Kennel Clubs - has changed this dog. In truth, the bulldog is cruelly malformed. The bulldog of the early nineteenth century, like those of 500 years earlier, had a broad head with a, moderately foreshortened muzzle. Its jaw was undershot, but although the occlusion of its splayed teeth was disrupted, at least it had a functioning set of jaws. Its legs were perhaps 10 percent longer than in today’s breed. Its ears were distorted but its tail was long.” (K. Thomson, *The Fall and Rise of the English Bulldog*, 1996)*

Dr Thomson stated: “What bloodstocks were blended with the original bulldog is unclear. But the result is beyond argument. A nasty transition took place from the tough English bulldog to the cruelly deformed animal we see today. Admiral in all ways except the physical deformity it rates now among the least athletic of dogs, puffing and grunting along. According to many authorities, in the late 1800’s the **bulldog** was bred with the pug in order to improve its disposition. Whether the cross with the pugs actually happened or not, in a period of about 50 years, the **bulldog** acquired a smaller, more chunky body, shortened legs and a piggy little tail. Whether by design or accident, it also acquired a drastically more distorted face.” (Keith S. Thomson, *American Scientist*, 84(3), 1996)

Dr Thomson stated: “Trying to unravel the genetic basis of the ‘**modern bulldog**’ would normally be impossible. However, we can get some clues from the extraordinary work of **Dr Stockard** of Cornell University. Craniofacial malformation is superficially similar in the **bulldog**, pug, Boston terrier and Pekingese, the result of various forms of chondrodystrophy of the developing axial skeleton, revealed most strongly at the two extremes - face and tail. Similarly the dwarfed distortion of the limbs is due to chondrodystrophy of the appendicular skeleton. These malformations result from a developmental defect in the pre-cartilaginous stage of bone formation. These dogs are being bred to preserve and even accentuate birth defects.” (Keith S. Thomson, *Am Sci*, 84(3), 1996)

Dr Thomson stated: “The extent of the phenotypic expression of the ‘gene’ depended in part on the genetic background into which it was bred. The characteristically broad skull and shortened face of the **bulldog** is under the control of a complex genetic system affecting the entire axial skeleton. Chondrodystrophic brachycephaly in the bulldog is different from that of the pug as it affects only the face. In the pug the mandible is shortened along with the face. Brachycephaly is also associated with the malformation of the basicranium and the creation of an almost spherical braincase. None of this is seen in the bulldog, which may suggest that the pug did not figure in the recent history of bulldogs after all.” (Keith Thomson, *The Fall and Rise of the English Bulldog*, *Am Sci*, 1996)

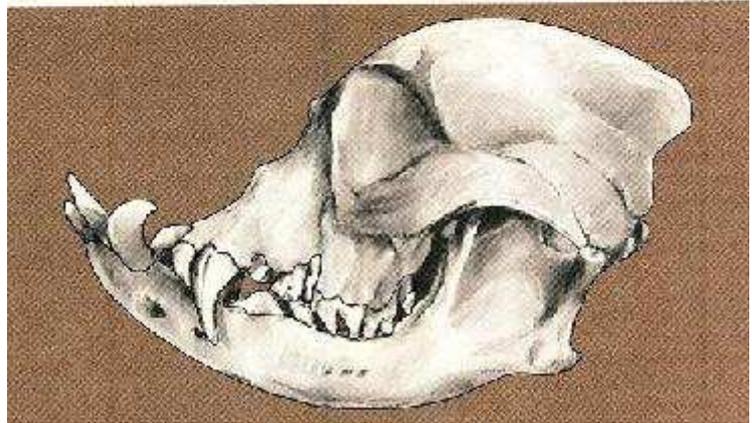
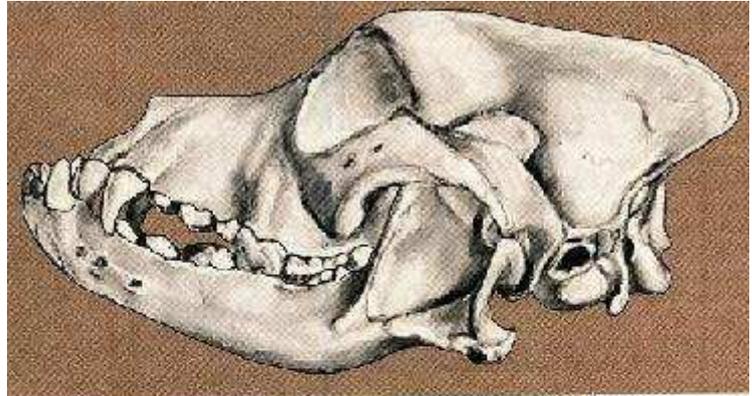
Dr Thomson stated: “The extreme foreshortening of the face may simply be due to strong selection - and severe inbreeding - within the **bulldog** line in which the axial skeleton defects were accentuated. The brachycephalic face is under the control of mostly recessive genes. When Stockard took the first-generation offspring from a cross and back-crossed them to a **bulldog**, the resulting offspring ranged in appearance from a modern **bulldog** to an old-fashioned **bulldog**, a boxer and mastiff. Various other versions of the same cross gave us the boxer. Crossing the **bulldog** with the (extinct) white English terrier gave us the bull terrier.” (Keith S. Thomson, *Am Sci*, 84(3), 1996)

Dr Thomson stated: “**Given this close relationship of the modern breeds, it ought to be readily possible to reverse at least some of the damage of the last hundred years and to breed a bulldog of healthier conformation. The American bulldog has been isolated in North America for at least 200 years. Successful attempts have been made on both sides of the Atlantic to breed a new - that is, old - bulldog using crosses with bull-mastiff, American bulldog and bull terrier to recover some of the old conformation. The results are already somewhere closer to the original breed, but restoration of the leg length seems to be difficult**”.

(Keith Stewart Thomson, *The Fall and Rise of the English Bulldog*, *Am Sci*, 84(3), 1996)

Dr Thomson concluded: “Excessive inbreeding is obviously wrong because it leads in most cases to less healthy animals. Deliberate selection for dysfunctional traits is, however, something quite different. It is clear that careful crosses have the possibility of restoring the bulldog line to something of its former dignity if not glory. One can make a strong ethical argument for this simply because the present trend in the evolution of the bulldog is producing a medical as well as a physical grotesquerie. In the meantime, breeders and owners alike have a lot to answer for”. (Keith S. Thomson, *The Fall and Rise of the English Bulldog*, *American Scientist*, 84(3), 1996)

“The present trend in the evolution of the bulldog is producing a medical and physical grotesquerie”.
“Breeders and owners alike have a lot to answer for”.



Left photo: Breeding the bulldog for pleasant temperament produced a cruelly deformed animal. Right: Top. Bulldog skull before 1890. Bottom. By 1935, face was significantly shortened, creating serious medical problems.

Photos and illustration are from Dr Thomson's article, kindly scanned for the present author by Dr Thomson himself ([Keith Stewart Thomson, 'The Fall and Rise of the English Bulldog', American Scientist, 84\(3\), May-June, 1996](#)).

Dr Randall Ott (DVM, MS), Professor of Production Medicine / Theriogenology at the College of Veterinary Medicine, University of Illinois stated: *"Dog-breeding practices have undoubtedly had an impact on the occurrence of inherited diseases and the myriad of diseases and deformities have become a cash-cow for the pet-repair type of veterinary practice. **Inherited diseases have not only accompanied the methods of breeding used to develop breeds and winning lines of show dogs, but were deliberately added to the dog's genotype.** Improving purebred dogs should be considered in terms of animal welfare".* ([Ott R, 'Animal selection and breeding techniques that create diseased populations and compromise welfare', J Am Vet Med Assoc, 208\(12\), 1996](#))

Drs G Ubbink (DVM), **J van de Broek** (PhD), **H Hazewinkel** (DVM, PhD) and **J Rothuizen** (DVM, PhD), Dept of Clinical Sciences of Companion Animals, Faculty of Veterinary Medicine, University of Utrecht, the Netherlands stated: *"Purebred dog populations have been subject to strong selection which has resulted in extreme differences between breeds and decreased heterogeneity within breeds. As a result, breed-specific inherited diseases have accumulated in many populations".* ([Ubbink G et al, Vet Rec, 142\(9\), 1998](#))

Dr Paul McGreevy (BVSc, PhD), Associate Professor of Animal Behaviour and Welfare Science, Faculty of Veterinary Science, University of Sydney, NSW, Australia is a member of the Scientific Advisory Panel for World Society for the Protection of Animals and the author of several publications (McGreevy P, 'Breeding for Quality of Life', *Animal Welfare*, 16(S1), 2007); (Paul McGreevy, 'A Modern Dog's Life', University of NSW Press, Sydney, 2009). With Frank Nicholas (also at University of Sydney and featured elsewhere in this report), he has long argued that **"many traits, which are really defects, have been included in the breed standards"**. (McGreevy P; Nicholas F, 'Some Practical Solutions to Welfare Problems in Dog Breeding', *Animal Welfare*, 8(4), 1999)

Dr McGreevy stated: "While acknowledging the major contribution made by dog breeders and dog breeding organizations in fulfilling the important need of humans for animal companions, breeders and scientists have long been aware that all is not well in the world of companion animal breeding. Many of the traits for which there was initially a functional basis were incorporated into the breed standards when dogs left the working arena and entered the world of dog shows. Now some show standards place more importance on appearance than on functionality. (McGreevy P; Nicholas F, 'Some Practical Solutions to Welfare Problems in Dog Breeding', *Animal Welfare*, 1999)

Dr McGreevy stated: "Some breed standards and selection practices run counter to the welfare interests of dogs, to the extent that some breeds are characterized by traits that may be difficult to defend on welfare grounds. Unfortunately, the incidence of certain inherited defects in some breeds is unacceptably high, while the number of registered animals of certain breeds within some countries is so low as to make it almost impossible for breeders to avoid mating close relatives. After breeders have taken into account the many traits incorporated into breed standards, there is very little selection pressure remaining to be devoted to traits that are directly related to welfare". (McGreevy P; Nicholas F, 'Some Practical Solutions to Welfare Problems in Dog Breeding', 1999)

Dr McGreevy stated: **"In some cases, traits that are best regarded as defects have actually been included in breed standards, eg brachiocephaly in the British bulldog.** Breeders compete with one another to see how well they can produce phenotypes that conform to a written standard – including traits that have, at best, questionable welfare benefits. **The bulldog is required to have a curved 'roach' back. It is therefore not surprising that bulldogs are sometimes born with twisted spines,** ie hemivertebrae. For the **bulldog**, the 'skull should be very large – the larger the better' (Pre-1987 Kennel Club, London). **This is a breed in which large foetal head size commonly leads to dystocia (difficulties in birthing)".** (McGreevy P; Nicholas F, *Animal Welfare*, 8(4), 1999)

Dr McGreevy stated: "If less attention was paid to traits of only peripheral importance, it would be possible to impose quite strong selection for relevant temperament and performance. A very simple de-selection criterion could be the number of trips to the veterinarian, or the total veterinary bill. **The minimum performance requirement is the ability to survive birth without assistance.** Where genes can be passed from one generation to the next only with the intervention of a veterinarian who performs a caesarean section to overcome relative foetal oversize, as in the **British bulldog**, it can be argued that both dam and offspring have failed an essential performance test". (McGreevy P; Nicholas F, 'Some Practical Solutions to Welfare Problems in Dog Breeding', *Animal Welfare*, 1999)

Dr McGreevy stated: "Even without pressure from breed standards, many breeders would still find themselves producing dogs with serious defects. Every animal that has ever lived has carried at least one deleterious recessive gene. The average number of deleterious recessive genes carried by an individual dog could be as high as twenty. The end result is that most breeds have their characteristic list of inherited defects. Each disorder brings with it different welfare concerns. Even those that are not life-threatening are still significant, ranging from the frustration of being less able to play due to respiratory problems in the case of brachiocephalics with compromised airways, to the stress of corrective surgery in dogs with orthopaedic problems". (McGreevy P; Nicholas F, 1999)

Dr McGreevy stated: "Because deleterious genes are maintained by natural selection at a low frequency, the incidence of any particular defect is so low as to go unnoticed. However **the mating of relatives dramatically changes the frequency of genotypes. In particular, it increases the frequency of homozygotes, which has the effect of bringing out deleterious recessive genes. The greater the level of inbreeding with close relatives, the greater the chance of breeding dogs with inherited defects.** Even in breeds with large numbers of registered animals, the tendency to concentrate on just a small number of families (often called **'line breeding'**, just another word for 'inbreeding') means that the actual rate of inbreeding is often far higher than one would expect from the number of dogs registered". (McGreevy P; Nicholas F, *Animal Welfare*, 8(4), 1999)

Dr McGreevy concluded: "There are several constructive ways to overcome these challenges. Breed associations can ensure that reduction of welfare problems is one of their major aims; they can review breed standards; they can embrace modern technology for animal identification and pedigree checking; they can allow the introduction of 'new' genetic material into closed stud-books; and they can encourage collaboration with geneticists in identifying and using DNA markers for the control of inherited disorders. There should be a concerted effort to produce and evaluate as companion animals first-cross (F1) hybrids from matings between various pairs of breeds". (McGreevy P; Nicholas F, 'Some Practical Solutions to Welfare Problems in Dog Breeding', *Animal Welfare*, 8(4), 1999)

Dr Vicki Meyers-Wallen (DVM, PhD), Associate Professor of Canine Genetics and Reproduction, Baker Institute for Animal Health, College of Veterinary Medicine, Cornell University stated: *"It may be best avoid mating combinations that we know will produce affected animals, rather than eliminate whole groups of genes from a population. This is particularly important for breeds with small gene pools, where it is difficult to maintain genetic diversity. **There is the potential to do harm if we fail to maintain genetic diversity, particularly in purebred dogs**".* (Meyers-Wallen V, 'Ethics and genetic selection in purebred dogs', *Reprod Domest Anim*, 38(1), 2003)

"The Bulldog breed as a whole can be described as 'the canine equivalent of a train wreck.'"

Dr James Serpell (BSc, PhD), Professor of Humane Ethics & Animal Welfare, Dept Clinical Studies, School of Veterinary Medicine, University of Philadelphia, USA has stated: ***"To meet a particular aesthetic in pursuit of fashion, the English Bulldog has been bred so selectively that they are severely crippled. Indeed, the breed as a whole can be described as 'the canine equivalent of a train wreck'.*** The breed is crippled by multiple insults to its nasal and respiratory system. The difficulty they have breathing while asleep is so pronounced that most of them die prematurely from heart failure due to chronic oxygen deprivation. These malformations mainly are due to a congenital defect known as chondrodystrophy, a developmental anomaly in the formation of bones that produces gross distortions, particularly in the craniofacial and appendicular skeleton. In humans, this condition causes a severe disability, and considerable research efforts are devoted to finding a cure for it". (Serpell J, *Soc Anim*, 2003)

Dr Serpell stated: *"Yet these animals are being deliberately bred to preserve, and even accentuate, the same disabling characteristics. **If bulldogs were products of genetic engineering by agri-pharmaceutical corporations, there would be protest demonstrations throughout the Western world, and rightly so.** But because they have been generated by anthropomorphic selection (by breeders), their handicaps not only are overlooked but even, in some quarters, applauded.* Regardless Ethical limits surely should disallow us from deliberately breeding companion animals who suffer from painful, distressing, or disabling physical or emotional handicaps or from surgically mutilating them in the interests of fashion or convenience". (Serpell J, 'Anthropomorphism and anthropomorphic selection – beyond the "cute response"', *Society & Animals* 11: 83-100, 2003)

Dr Serpell's numerous publications include: (Serpell J, 'Humans, animals and moral priorities' (*Anthrozoös*, 6: 96-8, 1993); (James Serpell, 'The Domestic Dog: Its Evolution, Behaviour and Interactions with People', Cambridge University Press, 1995); (James Serpell, 'Pets and companion animals', in Bekoff M (Ed), *Encyclopedia of Animal Rights & Animal Welfare*, Greenwood, Westport, CT, 1998); (James Serpell, 'Pets', (in 'Oxford Encyclopedia of the Modern World, 2007); and 'From Wolf to Dog', in *Grzimek's Online Encyclopedia of Animal Life*, 2009). Dr Serpell's numerous honours include: a) Scientific Advisor to the Governing Council, Royal Society for the Prevention of Cruelty to Animals, UK; b) 2006 Recipient of American Animal Hospital Association's Hills Animal Welfare and Humane Ethics Award; & c) Member of the Scientific Advisory Board, World Society for the Protection of Animals.

Dr Emma Milne, from BBC One's 'Vets In Practice', called specifically for an end to the breeding of **bulldogs**, which she described as **"mutated freaks"** and stated: ***"inbreeding to produce show dogs has led to damaging genetic weaknesses" leading to a situation where "modern bulldogs can't run, can't give birth and can't breathe due to problems with too much soft tissue in their mouth, resulting in a dog that is struggling for air all its life, so that there is no such thing as a healthy bulldog".*** **"Bulldog breeding ban urged"**, read the headline, with the report pointing out that individuals with the flattest faces, biggest shoulders and smallest hips are mated, creating, according to many veterinarians, dogs with health defects that would never have surfaced through natural selection and noting that the **bulldog** is on a list of pedigree breeds that the Council of Europe wants to see banned in their current form. (BBC News, *Real Story BBC One, Monday, 14 June, 2004*)

Dr Frank Nicholas (BSc, PhD), Professor Emeritus and **Dr Peter Thomson** (MSc, PhD), Associate Professor, at the Faculty of Veterinary Science and the Centre for Advanced Technologies in Animal Genetics, at the University of Sydney in Australia stated: *"Given the widespread utilisation of estimated breeding values (EBVs) in selection of production animals, it is somewhat disappointing that they have not been more widely utilised in the control of inherited disorders in companion animals. But it is never too late! Breed societies should be consulting local quantitative geneticists right now, to establish schemes for the control of multifactorial disorders via selection on EBVs".* (Nicholas F; Thomson P, 'Inherited disorders: sustained attack from several quarters', *Vet J*, 168(2), 2004)

Dr Elaine Ostrander (BS, PhD) and her so-called **Ostrander Group** at the National Human Genome Project in Bethesda, Maryland, are leading the field of canine genetic research with co-operative projects at institutions worldwide. Dr Ostrander, a geneticist, is Chief Investigator, Cancer Genetics Branch and Head, Comparative Genetics Section at the National Institutes of Health. In the parallel Canine Genome Project, Dr Ostrander's team are examining landmark regions in dog DNA sequence from pure breeds to identify variants important in disease susceptibility, behaviour, and morphologic variation in the domestic dog, including the Bulldog. Cancer is the number one killer of dogs and Dr Ostrander's laboratory is mapping the genes responsible for cancer susceptibility.



The Ostrander Group has determined that pedigree dogs are the multigenerational result of directed matings, which favour the expression of recessive disorders. Their studies on genes important in growth regulation identify loci and sequence level variants that are under strong regulatory selection in the domestic dog and they continue to work towards identification of genes controlling differential growth of the canine leg length and width, skull shape, and overall body plan. Professor Ostrander's main collaborators are post-doctoral research fellows, Dr Heidi Parker (PhD) at the Cancer Genetics Branch, National Institutes of Health, and Dr Nathan Sutter (PhD), Assistant Professor of Medical Genetics at the Faculty of the College of Veterinary Medicine, Cornell University, USA. I shall abstract just one of many articles here, with more by the Ostrander Group to follow chronologically throughout:

*"Most dog breeds have existed as **closed breeding populations** for nearly four centuries, leading to the development of **breeds enriched for particular genetic disorders**, nearly half of which occur predominantly or exclusively in one or a few breeds with a near absence in other breeds, indicating that a subset of dog breeds are strongly enriched for particular disease alleles as a result of origination from a small group of founders, population bottlenecks and popular-sire effects. **It will be incumbent on us to use the information from canine genetic studies to improve not only our own health and well being, but also that of our closest companion**". (Sutter N and Ostrander E, 'Dog Star Rising: The Canine Genetics System', Nature Reviews: Genetics, Volume 5, December 2004)*

Marla Anderson, then at Simon Fraser University and currently a PhD candidate and lecturer at McMaster University, BC, Canada stated: *"The desire for our canine companions to meet our expectations has lead to breeding practices designed to produce characteristics more desirable to human in Western culture: (a) animals dressed in designer clothes; (b) physical mutilation such as tail docking and ear cropping; and (c) complete modification of genetic make up. They also create varying degrees of suffering. **English bulldogs have been modified genetically into a creature who endures numerous physical deformities. These dogs suffer from sleep apnea, excessively labored breathing, and premature death as a result of chronic oxygen deprivation. In addition, because of the fashion of bulldogs with abnormally large heads and proportionately small hips, most must be born by Cesarean section**". (Anderson M, Henderson D, 'Pernicious Portrayals', Society & Animals, 13:4, 2005)*

Amy Young (BS), Manager of the Bannasch laboratory at the School of Veterinary Medicine, University of California, Davis, stated: *"The **bulldog** is perhaps the most easily recognized of the brachycephalic breeds, the Standard of which requires prognathism, undershot bites, a short muzzle and wide-set, round eyes. The rounder skull is associated with dogs bred for fighting, with the shorter muzzle and wider back skull being more powerful for biting. **Unfortunately, normal respiration is compromised in dogs with brachycephalic head types, particularly in warm weather. A resulting condition, brachycephalic airway syndrome, which can include a hypoplastic trachea, everted laryngeal sacculles, elongated soft palate, and stenotic nares, sometimes requires surgery to improve airflow in affected animals**". (Amy Young & Danika Bannasch, 'Morphological Variation in the Dog', in Elaine Ostrander (Ed), 'The Dog and Its Genome', Cold Spring Harbour Monograph Series 44, 2006/7)*

"English bulldogs have been modified genetically into a creature who endures numerous physical deformities."

Dr Kevin Stafford (MSc, PhD), Professor of Applied Ethology and Animal Welfare with the Institute of Veterinary, Animal and Biomedical Sciences, Massey University, New Zealand, stated: *"In the last three decades of the 20th Century, developments in veterinary medicine and surgery allowed even more extreme physical characteristics to be bred (in some dogs). **The skull of the Bulldog should be very large (according to the Standard), but a large fetal head size predisposes bitches to dystochia. Caesarean section has become almost passe**'. Now is the time to change Breed standards that predispose animals to physical problems and disease. There are hundreds of dog diseases that are inherited or have a major heredity component and more are identified every year. Many show high prevalence in some breeds"*. (Kevin Stafford, 'The Welfare of Dogs', Springer, 2006)

Dr Stafford stated: *"The canine genome has accumulated many mutations since domestication and some are significant in that they cause disease. The development of breeds in the last 150 years required inbreeding and genetic isolation. Individual champions reduced the gene pool further by being widely used as popular sires and more recently, fewer dogs were used as particular traits were sought after. **The tendency to use only a small percentage of available stock has resulted in an increase of autosomal recessive and other types of inherited diseases in purebred dogs and selection for particular characteristics may have even increased the prevalence of inherited diseases"**. (Kevin Stafford, 'The Welfare of Dogs', Springer, 2006)*

Dr Francis Galibert (PhD), Emeritus Professor, University of Rennes, and **Dr Catherine Andre'** (PhD), Senior and Staff Scientists respectively of Laboratoire de Génétique et Développement, Centre National de la Recherche, Rennes, France, stated: *"Over the last few centuries, several hundred dog breeds have been artificially selected through intense breeding. **Characteristic traits were selected by reducing the gene flow between breeds and concentrating the particular alleles governing these traits within each breed, resulting in a genetic isolate. Unfortunately, this practice has also concentrated the alleles of other genes that are responsible for simple Mendelian genetic diseases or for increasing susceptibility to complex diseases. Today, all breeds suffer from different, often specific diseases having clear genetic origins"**. (Galibert F, Andre' C, Vertebrate Genomes, Genome Dyn, Karger, Basel, 2:46–59, 2006)*

Dr Todd Riecks (DVM, DACVS) at the Dept of Veterinary Clinical Sciences, College of Veterinary Medicine, Ohio State University, stated: *"**The breed predominantly affected by the brachycephalic syndrome is the English Bulldog. Elongated soft palate is the most common abnormality (87.1% of dogs); the most common combination of abnormalities is elongated soft palate, stenotic nares, and everted sacculles (25.8% of dogs). The English Bulldog was the most common breed for all abnormalities, including elongated soft palate (50% of dogs), stenotic nares (38.9% of dogs), everted sacculles (55.6% of dogs), hypoplastic trachea (53.9% of dogs), and laryngeal collapse (40% of dogs). Surgical treatment of brachycephalic syndrome appears to be associated with a favorable long-term outcome"**. (Riets T et al, J Am Vet Med Assoc, 230(9), 2007).*

Dr Koharik Arman (DVM) stated: *"**More than 500 genetic defects exist in today's purebred dogs. Inherited diseases such as hip dysplasia, brachycephalic airway syndrome, cardiomyopathies, endocrine dysfunctions, blood disorders, and hundreds more, affect the quality of life and longevity of these dogs. Over 400 breeds currently exist, but they are artificial constructs of human fancy, instead of the evolutionary outcome of natural selection. The wide array of genetic diseases found in purebred dogs reflects their unnatural development, by kennel clubs and breeders who are largely responsible for this welfare predicament"**. (Arnan K, 'A new direction for kennel club regulations and breed standards', Can Vet J, 48(9), 2007)*

Dr Arman stated: *"Veterinarians have also facilitated the progression of this situation and must partake in its resolution. Hopefully, dog owners, responsible breeders, veterinarians, and animal welfare scientists can assert enough pressure to convince kennel Clubs and other breeder associations to re-evaluate and redefine their breed standard regulations to end the inbreeding that causes so many genetic problems. Several aspects of purebred inherited diseases must be investigated to determine what changes need to be made in current breeding practices, and how these changes can be implemented effectively". (Arnan K, Can Vet J, 48(9), 2007)*

Dr Arman stated: *"The historical role of dog fancies, modern kennel club breed standards, breeding methods, and canine genetics must be explored to understand the main causes of the problem and how it can be resolved. Pertinent breeder and veterinarian ethical responsibilities should also be considered. Throughout the 19th century, however, dog show and kennel club administrators pushed for the morphological perfection of dog breeds by insisting on rigid adherence to the rules of typology and ancestry. No importance was placed on the utility and health of purebred dogs. The purebred principle and strict breeding rules, however, were not introduced until the late 19th century". (Arnan K, 'A new direction for kennel club regulations and breed standards', Can Vet J, 2007)*

Dr Arman stated: “Dog breeding and showing evolved into a popular sport and during the Victorian era, a pedigree system was established, and the canine gene pool rapidly became depleted as inbreeding, line breeding, and over-use of sires became common practice. Rigid regulations, fixed breed standards, and the disproportionate significance attributed to typology dictated the development of these breeding methods. Today, many of the resultant dog breeds are no longer capable of performing the tasks for which they were originally bred, due to the anatomical and/or physiological deformations that kennel clubs have imposed upon them. Charles Darwin coined the term ‘artificial selection’ to describe how humans were influencing inherited traits in other species, effectively replacing the naturally occurring mechanisms that select for genetic fitness.” (Arnan K, Can Vet J, 48(9), 2007)

Dr Arman stated: “Many kennel clubs worldwide still prescribe to conservative, centuries’ old ideologies and traditions that are harmful to the canine species. Breed Standards consist of exhaustive guidelines that detail the aesthetic requirements of each breed, but they overemphasize typology, which is not conducive to advancing canine health. These ongoing attempts to create the ultimate canine conformation, with continually elevated ideals, are precisely what result in detrimentally exaggerated physiques and diseased animals. Such principles beg the question, why promote the concept of the hypothetically superior purebred? A superior canine strain, or breed purity, was considered attainable by ‘breeding the best to the best’”. (Arnan K, Can Vet J, 2007)

Dr Arman explained: “Breed development, as it is practiced today, consists of four stages: The 1st stage is the ‘Founding Event’ — a finite number of individuals are chosen from a source population to contribute the genetic material for the breed. The 2nd stage is ‘Isolation’ — the breed must be genetically isolated from other canines, so that random exchange of genetic material cannot take place. The 3rd stage is ‘Inbreeding’ — the mating of two closely related individuals that share common ancestors. The 4th stage is Artificial Selection — Inbreeding alone does not result in desired typology and elimination of unwanted qualities, so individuals from early generations are selected so that only those possessing desired traits may reproduce. (Arnan K, Can Vet J, 48(9), 2007)

Dr Arman explained: “These four steps create a new genome, with traits that can be reproduced by the breed itself in a reliable and consistent manner. This phenomenon is made possible because of the lack of phenotypic and genetic heterogeneity that the breeder attains in the new genome. According to general breeding philosophy, ‘Inbreeding is a method of holding fast to that which is good and of casting out that which is bad by establishing homozygous purity’. The number of individuals used as founding stock, and how closely related they are, is paramount to the genetic health of the breed. Unfortunately, many breeds originate from a limited few individuals, often siblings or half-siblings that are already inbred to an extent”. (Arnan K, Can Vet J, 48(9), 2007)

Dr Arman stated: “The advent of pedigree systems in the 1800s, developed by kennel clubs with the goal of breed improvement adds another genetic obstacle to already compromised breeds. Breed registries are only open for a short period during the Founding Event and then closed. No individuals may be registered to the breed unless they are descended from the founding stock and so, no new genetics are brought in. Kennel club regulations create and sustain artificial ‘bottleneck’ conditions. At the level of individual breeders, ‘line-breeding’ (inbreeding) methods continue to be used in pursuit of improving their individual stock. Inbreeding is also used as a technique to rapidly develop new typologies to be registered as breeds, it is also standard practice for dog breeding. What would a scientific assessment of Kennel Club philosophies and breeding methods reveal?” (Arnan K, Can Vet J, 2007)

Dr Arman stated: “Current genetic evidence refutes the theory of inbreeding for typological traits to achieve breed purity. Population genetics is the tool that exposes the fallacy of purebred dogs. It is used to calculate gene frequencies and that of alternative alleles within genes, both of which are integral to assessing the health of a species. An individual canine’s genotype will dictate the production of specific structural and functional proteins, and in combination with environmental influences, result in individual phenotypes, or visible outcomes. If both parents supply the same allele for a particular gene, the offspring is regarded as homozygous for a specific trait. If the alleles supplied by each parent are different, then the offspring is heterozygous for that trait”. (Arnan K, 2007)

Dr Arman explained: “The Hardy-Weinberg Principle describes how in most species, a natural balance maintains a high degree of genotypic heterozygosity in order to preserve genetic fitness and hence, species’ health. High rates of homozygosity can occur in nature due to “bottleneck situations,” such as a limited gene pool in island populations, but in canines, homozygosity is deliberately accomplished by people trying to achieve specific breed standards. Many desired breed traits are recessive, rather than dominant, and require that both copies of the inherited alleles be the same for the trait to be expressed phenotypically. Individuals selected for consistent expression of alleles specific to desired physical traits, results in offspring that are homozygous”. (Arnan K, 2007)

Dr Arman stated: “Breed purity and genotypic homozygosity is harmful to canine health because it requires inbreeding and results in an abnormally high occurrence of inherited diseases. Unfortunately, when breeders selectively “double up” on desired traits for physical conformation, they also double up on genes that can result in increased disease. All individuals carry deleterious genes, but in a heterozygous state, are not expressed and are ordinarily recessive.” (Arnan K, Can Vet J, 2007)

Dr Arman explained: *“Deleterious alleles are still present in heterozygous populations; however, when infrequent homozygosity of these genes occurs naturally, the individuals are eliminated through natural selection, due to their inferior fitness. The existence of deleterious alleles in a population, therefore, does not affect a species’ overall fitness. The doubling up of both good and bad genes occurs through linkage disequilibrium where alleles at two or more loci, not necessarily on the same chromosome, do not assort independently of each other. Consequently, when breeders select for preferred traits, which are often inherently harmful, in addition to obtaining the ‘good’ gene, they also select for or against every other gene specifically linked to the desired typology”.* (Arnan K, 2007)

Dr Arman stated: *“**The resultant purebreds possess homozygous genes for naturally occurring lethal, sub-lethal, and sub-vital alleles;** hence, the existence of some 500 genetic defects amongst purebred dogs. **Such breeding practices do not have the welfare of the individual dogs at heart; rather, they reflect humans’ pursuit of recognition in the show world, and prosperity in sales.** The genetic damage, or the inbreeding depression, that occurs due to these breeding methods can be measured by using a formula referred to as ‘Wright’s Coefficient of Inbreeding’ (COI). Inbreeding depression is the complex of behavioural, physical, and reproductive problems that result from the abnormally homogeneous genotypes described”.* (Arnan K, 2007)

Dr Arman explained: *“The COI is used to calculate the statistical probability that two random alleles at a certain locus are identical by common ancestry; this coefficient can range from 0% to 100%. Complete manual calculation of a COI is an exhaustive task, but computer pedigree software such as ‘CompuPed’ greatly facilitates the process. Many breed Founder events incorporated so few individuals that, if the COIs of all current members of such a breed are calculated all the way back to the Founders, the COIs will only vary by a fraction of 1%. In a natural population, two arbitrarily selected individuals should have a COI of 0%, but many dog breeds today average COIs significantly greater than 25%, if only ten generations are included in the calculation.* (Arnan K, Can Vet J, 2007)

Dr Arman stated: *“Recent studies have demonstrated that for every 10% increase in COI, there is a 7% decrease in litter size and median life span, and that any COI above 9% pushes perilously past the genetic threshold of health. ‘Wright’s Coefficient of Relationship’ (RC), measures the degree of genetic relation between two individuals. Normally, two random individuals in a population will have an RC of 0, and two siblings will have an RC of 50%. In many dog breeds, two randomly chosen individuals will have an RC above 50%, which is a degree of genetic relation greater than that of two siblings. Two purebred siblings will frequently have an RC measure greater than 80% and identical twins 100%. **The alarming reality is that ‘unrelated’ purebreds today are actually genetically related to a greater extent than individuals that are truly related!**”* (Arnan K, Can Vet J, 48(9), 2007)

Dr Arman stated: *“Now, with a basic understanding of the genetic truth of breed purity, myriad causes can be implicated in generating the high RC and COI values seen in today’s dog breeds, and the resultant effects on canine health can be fully appreciated. Another matter to consider is that **the desired traits that breeders select for are often detrimental to breed health.** Examples include the purposeful breeding of chondrodysplastic **bulldogs**, because their morphology is perceived as cute, or selecting for defective development of the embryonic neural canal because the ridge of stiff hair on the back of a Rhodesian ridgeback is considered attractive”.* (Arnan K, ‘A new direction for kennel club regulations and breed standards’, Can Vet J, 48(9), 2007)

Dr Arman stated: *“In the previous sense, **inherited disease is not only being manifested in purebreds accidentally, but is also being deliberately cultivated in many breeds.** What does a scientific analysis of breed purity reveal? Present medical knowledge and genetic research provide a definitive answer: **Purebred dogs present us with an urgent welfare issue that needs to be resolved!** What constitutes adequate welfare for canines? A useful framework for assessing animal welfare is the ‘five freedoms’ established in 1965 at the University of Bristol (Mullan S, Main D, ‘Principles of ethical decision-making in veterinary practice’, Vet Rec, 149(11), 2001); (Arnan K, 2007)*

‘The Five Freedoms’ Framework for assessing animal welfare

1. Freedom from thirst, hunger, & malnutrition;
2. Freedom from pain, injury & disease;
3. Freedom from fear & distress;
4. Freedom from physical & thermal discomfort; &
5. Freedom to perform most normal forms of behaviour.

Dr Arman stated: *“**Kennel clubs (or unions), breeders and veterinarians are strongly implicated in having created and sustained and are morally responsible for the current situation and unhealthy state of the purebred canine population.** Kennel clubs and unions control the actions of registered breeders and, thus, have direct responsibilities toward the animals and the breeders. **Scores of violations of the “five freedoms” are committed against purebred dogs by breeders following the kennel club / kennel union guidelines that dictate the manner in which these dogs are created.** Many breeds are now unable to complete birth/parturition without a caesarean and many breed conformations directly violate the principle of ‘sound’ health”.* (Arnan K, 2007)

“The desired traits that breeders select for are often detrimental to breed health.”

Dr Arman enquired: "So where should kennel clubs (or unions) go from here? How should the purebred be redefined, so that health and utility are equal to type? **Dr Arman advised:** "The most important change to be initiated is the opening of all dog breed registries to allow an increase in genetic variation. Additionally, the kennel clubs (or unions) should follow the example of the agriculture industry and set minimum COI numbers for foundation stocks at less than nine during breed establishment. If dog breeders were to be subjected to Foundation stock regulation, the frequency of heritable diseases in purebred dogs would decrease, and eventually many would be eliminated". (Arnan K, 'A new direction for kennel club regulations and breed standards', Can Vet J, 48(9), 2007)

Dr Arman stated: "If kennel clubs permit increased genetic variety amongst registered dog breeds, the inbreeding depression that is so rampant today will eventually decline. Canine breeds can and should be differentiated, bred, and maintained on a dynamically balanced, heterozygous population basis without restriction to a closed, historic founder group. Many responsible breeders are saddened by the condition of their dogs, but are unable to remedy the situation because kennel clubs (or unions) bar the introduction of new genetic variety and methodologies. The purpose of cynological associations is to facilitate the work of breeders, rather than impede it. Breeders should be allowed to determine where outcross animals may best be obtained for specific breeds in order to improve their dog's health. (Arnan K, 'A new direction for kennel club regulations and breed standards', 2007)

Dr Arman stated: "Kennel clubs should not only permit genetic improvement, but they should also reinforce it. **To motivate breeders to increase their genetic pools, kennel clubs must also redefine their breed standards to include health, vigour, and temperament, in addition to typology.** To enforce the maintenance of genetic improvement, tools such as DNA analysis are available and should be used by breed associations to monitor heterozygosity and relationships in major lines by random DNA testing. To introduce new breeds, assortative breeding, rather than inbreeding and line breeding can be implemented". (Arnan K, Can Vet J, 48(9), 2007)

Dr Arman stated: "The Africanis Society of Southern Africa is an excellent example of an ethically responsible canine association. Its purpose is to conserve the Africanis dog that has evolved through natural selection rather than to artificially develop the breed and segregate it to create new breeds. The heterogeneity of the various Canis africanis ecotypes is valued for the fitness it imparts to them. It is an excellent example of how nature will 'breed' dogs that are capable of adapting to changes in their environment, resistant to common parasites and diseases, and principally free of inherited diseases. The Africanis Society maintains a strict code of ethics, and all registered dogs are inspected and approved. There is a standard DNA testing policy to avoid differentiation of morphological types and to preserve the gene pool as a heterogeneous entity". (Arnan K, Can Vet J, 48(9), 2007)

Dr Arman stated: "Veterinarians bear some responsibility for the welfare situation of purebred dogs. In fact, the veterinary profession has facilitated the evolution of purebred dogs. Breeds that would not normally be sustainable are propagated by the compliance of veterinarians to breeder wishes. **Breeds such as the bulldog cannot complete parturition without surgical intervention, and dogs with severe hip dysplasia would be euthanized if they could not have their hips surgically corrected.** In the welfare scenario of the purebred dog, there are 4 viewpoints to consider. First is the welfare of the dogs, 2nd is the welfare of the owners, 3rd is the welfare of the veterinarian, and 4th is the welfare of the breeders". (Arnan K, Can Vet J, 48(9), 2007)

Dr Arman stated: **"Purebred breeding methods replace nature's role and condemn purebred dogs to live with health problems. It is irrefutable that these defects cause pain and suffering to the dogs that bear them. Dog breeding principles do not provide beneficence to the dogs; on the contrary, they result in many injustices to them. Deliberate manipulation of a dog's genome, the essence of its life, is an extreme violation of its autonomy.** As veterinarians, we are responsible for both owner and patient interests, and it is clear that purebred breeding methods compromise the welfare of both parties". (Arnan K, Can Vet J, 48(9), 2007)

Dr Arman stated: "Breeders may be very attached to their breed of dog and will not enjoy negative commentary. Current breed standards give breeders financial incentive to continue inbreeding and until breed standards are amended, it may be difficult to convince breeders otherwise. However, no matter how great the breeder's financial reward for producing purebred dogs, our primary duty as veterinarians should be the improvement of our patient's welfare and in meeting the needs of the owners, even if it compromises the breeders' business. Similarly, veterinarians must not allow the financial contribution of purebred health issues to outweigh the welfare of their patients and clients". (Arnan K, 'A new direction for kennel club regulations and breed standards', Can Vet J, 2007)

Dr Arman concluded: "The high frequency of genetic disease that has developed in purebred dogs over the last century has resulted in the desensitization of society and veterinarians to the resultant welfare issues to such an extent that the production of anatomically deformed dogs are not shocking nor considered abnormal. Change will occur when there are financial incentives. There are currently no market forces to dissuade the breeding of dogs that require caesarean births, because both breeders and veterinarians benefit financially. Change needs to begin at the level of the consumer, because when public awareness of purebred dog welfare increases, consumer dissatisfaction will demand improvements from the industry, and breeders will be economically motivated to comply". (Arnan K, 'A new direction for kennel club regulations and breed standards', Can Vet J, 48(9), 2007)

Dr Robert Mahr (DVM), a Congressional honoured veterinarian wrote to an American journal Editor in protest, which was published as follows: '**Believes Bulldog design is inhumane**'. "On the cover of the May 1, 2007, JAVMA, there were five **English Bulldogs**. I believe that **this breed is a sorry example of humans' inhumanity to dogs through breeding**. I don't think that dogs of this breed belonged on the cover of the official journal of our national association, which is supposed to be dedicated to relieving animal's suffering and improving animal and human health. I believe that **this breed is inhumane**. In view of the oath we have taken as veterinarians, I believe **we must stop this inhumane designing of our companion animals and think of the loveable dog that must live its life under these conditions**". (Letters to the Editor, Robert L Mahr, J Am Vet Med Assoc, 233(5), 2008)

Dr Patty Khuly (DVM) in response to the above, stated: "In many ways I couldn't agree more and the problem isn't confined to **bulldogs**. **The English bulldog is probably the world's most egregious example of breeding for canine unthriftiness**". We all know other breeds that raise similar concerns. "**Nothing beats an English bulldog for its intentionally diseased conformation!**" Dr Khuly lists a few traits that bulldogs are specifically bred for:

1. "**Chondrodystrophic conformation (dwarfism)**, in which limbs are intentionally shortened and rotated and the skull is disproportionately enlarged. **The consequences of this deformation process include joint disease (almost uniformly present), spinal malformation (very common), extremely difficult natural delivery of pups (extremely common), and the production of skin folds that lead to severe, chronic skin disease (also very common). Bulldogs are also genetically predisposed to allergies through irresponsible breeding practices**".

2. "**Brachycephalic conformation (short-snoutedness)**, in which the skull is compressed. **Respiratory and dental malformations are a necessary consequence of breeding for this trait. Tissue folds accumulate in the upper airway, leading to overlong soft palates (a flap of tissue that occludes the opening of the larynx), heat intolerance, stenotic nares (tight nostrils), tiny windpipes and sometimes even more catastrophic internal diseases (like hiatal hernias, the result of all the huffing and puffing they have to do to get enough oxygen to their lungs)**".

"**Both of these built-in major malfunctions also lead to a greater than average susceptibility to a wide variety of diseases. And then there are all the diseases so common to English bulldogs: allergic skin disease, intervertebral disc disease, dry eye, gastrointestinal sensitivity and dietary intolerances, among many others**". Is it any wonder that a veterinarian is concerned about the inescapable realities of building dogs for conformational extremes?

"Those veterinarians deeply devoted to animal welfare principles (an increasing percentage of us) are rightfully starting to speak out about not just the ear crops and the declaws we do to animals once they are alive, but also the very act of building such an inhumane body for the animals we have taken an oath to protect and care for. Knowing that we intentionally build dogs to suffer like this, I have to ask, is it fair?" (Khuly P, 'Bullishly inhumane by design? On bulldog breeding and welfare', Stanford Wellsphere, 30 Sept, 2008)

Dr Frederico Camboli (PhD), a geneticist in the Department of Epidemiology, at Imperial College in London, and Dr Jeff Sampson, a molecular biologist, formerly with Leicester University, now U.K. Kennel Club Canine Genetics Co-ordinator, are researching genetics of pedigree dogs to understand canine genetic diseases to enhance their welfare. They utilised the world's most extensive resources for canine population-genetics studies: the Kennel Club registration database, chose ten representative breeds and analysed their pedigrees since electronic records were established in 1970, corresponding to about eight generations before the present and investigated population structure directly, without genotyping, to assess levels of inbreeding and population structure.

Drs Camboli and Sampson stated: "Dog breeds are required to conform to a breed standard, the pursuit of which often involves intensive inbreeding. Dog breeding patterns can be driven by stud value assessed when shown and by conformance to breed standards. The breeding programs implemented by dog breeders, including use of 'popular' sires, could lead to cryptic population structure. **Bulldogs show high levels of inbreeding. A low proportion of genetic diversity is retained under strong inbreeding and has adverse consequences in terms of loss of genetic variability and high prevalence of recessive genetic disorders. This raises concerns about canine welfare**". (Camboli F et al, 'Population Structure and Inbreeding From Pedigree Analysis of Purebred Dogs', Genetics, 2008)

Drs Camboli and Sampson concluded: "Dog registration rules have been rigidly enforced only for 50 years. Prior to that occasional out-crossing was still possible. Loss of genetic variation, with many breeds losing greater than 90% of singleton variants in just six generations, has adverse consequences for canine health and fertility. Remedial action to increase genetic diversity should now be a high priority in the interests of the health of purebred dogs. Possible remedial action includes limits on the use of popular sires; encouragement of matings across national and continental boundaries; and the relaxation of breed rules to permit controlled out-crossing". (Camboli F et al, 'Population Structure and Inbreeding From Pedigree Analysis of Purebred Dogs', Genetics, 179(1), 2008)

Dr Andreas Steiger (PhD), Professor of Animal Welfare in the Veterinary Medicine Faculty, Institute of Domestic Animal Genetics, Dept of Animal Husbandry and Welfare, University of Bern, Switzerland expressed concerns with the welfare of extreme breeds of dogs. Citing the Council of Europe Resolution on the Breeding of Pet Animals, the Declaration of Intent of the International Dog Breeding Organisations and the Resolution of the Federation of Veterinarians of Europe, he stated that: *“Legislation and other measures to avoid breeding animals with extreme characteristics is necessary and it is important that breeding organisations adapt breeding standards and improve the education of judges and breeders”*. (Steiger A et al, Schweiz Arch Tierheilkd, 150(5), 2008)

Dr Andrew Higgins (BVetMed, MSc, PhD, FIBiol, MRCVS), Editor-in-Chief of Veterinary Journal and previously, for a decade, Scientific Director of the Animal Health Trust, UK, and **Dr Frank Nicholas** (BSc, PhD) stated: *“A BBC television documentary, ‘Pedigree Dogs Exposed’, shown at prime time August 2008, was hard hitting, highlighting inter alia, **bulldogs bred in such a way that most can no longer give birth unassisted**. The programme’s message can be summarised in the words of the RSPCA’s Chief Veterinary Adviser: ‘the welfare and quality of life of many pedigree dogs is seriously compromised by established breeding practices for appearance, driven primarily by rules and requirements of competitive dog showing and pedigree dog registration’*. (Higgins A, Nicholas F, *The breeding of pedigree dogs: time for strong leadership*, Editorial, Vet J, 178(2), 2008)

Drs Higgins and Nicholas stated: *“The British Veterinary Association commented that this was an exposé of the very worst elements of pedigree dog breeding, but stressed that it continued to work closely with the Kennel Club in developing canine health schemes and supporting the significant amount of genetics research funded by the Kennel Club’s Charitable Trust. The study by Calboli et al (2008) was enabled by the Kennel Club, as a reflection of its on-going commitment to genetics research and its desire to secure a scientific platform to obtain breeder support to increase genetic diversity. However, it has become increasingly clear that there are issues that need to be urgently addressed now. Recommendations for practical solutions were proposed by McGreevy and Nicholas (1999) nearly 10 years ago*. (Higgins A, Nicholas F, Editorial, Vet J, 178(2), 2008)

Drs Higgins and Nicholas stated: *“Of course many of the members and governance personnel of the Kennel Club are pedigree dog breeders. It is right therefore to pause and consider the extent to which welfare may have become subordinated to certain breed practices. It is not difficult to see how, after generations of owners have spent years focusing on the morphology of their dogs, some find it hard to see the proverbial wood for the trees. Breed standards can easily become entrenched in the minds of breeders, buyers and fanciers, as well as those (often interested parties) who are involved in the judging (and so promotion) of a breed and its ‘established’ characteristics”*. (Higgins A, Nicholas F, Vet J, 178(2), 2008)

Drs Higgins and Nicholas stated: *“As Paul McGreevy commented (New Scientist, 11 October 2008), **‘the best dog breeders are very good at what they do – the problem is that what they currently do is not very good’**. The problems created by some breed standards are very serious and have major welfare implications and the mating of close relatives remains genetically undesirable. **Some animals still result from matings of first-degree relatives, and a strong case can be made for the Kennel Club to stop registering the progeny of such matings”***. (Higgins A, Nicholas F, *The breeding of pedigree dogs: time for strong leadership*, Vet J, 2008)

Drs Higgins and Nicholas concluded: *“Breeders and regulators have no choice but to make the welfare of the dog paramount. This means that breed standards must be reviewed scientifically and rationally as a matter of the utmost priority. Welfare charities, veterinary associations and dog breeders must unite in using the latest advances in genetics and epidemiology to find a new model of dog-breeding practice. Change will take time and will require difficult negotiation, which may be a real challenge for the Kennel Club in UK and other breed standard regulators around the world. However, it is a challenge that must be addressed or governments, under public pressure, are likely to get involved and impose legislation to protect the health and welfare of man’s favourite companion”*. (Higgins A, Nicholas F, *The breeding of pedigree dogs: time for strong leadership*, Editorial, Vet J, 178(2), 2008)

Dr Lucy Asher (BSc, PhD), research associate, Centre for Animal Welfare, Dept of Veterinary Clinical Sciences, The Royal Veterinary College, Herts, UK, and associates (Diesel G, Summers J, McGreevy P & Collins L) stated: *“The United Kingdom pedigree-dog industry has faced criticism because certain aspects of dog conformation stipulated in the UK Kennel Club breed standards have a detrimental impact on dog welfare. A review of conformation-related disorders was carried out in the top 50 UK Kennel Club registered breeds, using systematic searches. A novel index to score severity of disorders along a single scale was also developed and used to conduct statistical analyses to determine the factors affecting reported breed predisposition to defects”*. (Asher L et al, *Inherited defects in Pedigree Dogs. Part 1: disorders related to breed standards*, Vet J, 182(3), 2009)

Dr Asher et al stated: “Appearance matters in the pedigree dog industry. Pedigree dogs are selected to conform to published breed guidelines that are open to interpretation and dogs that best meet their breed’s standards are rewarded in the show ring. Conformational breed-associated defects were recognised as early as 1868 by Charles Darwin. To date, research has primarily considered inherited disorders in isolation. For example, an elongated soft palate is associated with a shortened muzzle and entropion is linked with skin folds around the eye. However, to be able to make informed decisions about the impact on dog welfare of conforming to breed standards, interdisorder comparisons are necessary to bring together clinical and epidemiological research”. (Asher L et al, Vet J, 2009)

Dr Asher et al stated: “In the top 50 breeds, a total of 396 inherited disorders were identified from the literature and other sources searched. Each of the top 50 breeds was found to have at least one aspect of its conformation predisposing it to a disorder; and 84 disorders were either directly or indirectly associated with conformation. German shepherd dogs were reported to be predisposed to the greatest number of inherited disorders overall. Miniature poodles were reported to be predisposed to the most conformational related disorders, followed by the Pug, Bulldog and Basset hound”. **Table 1. The Bulldog totals 42 disorders.** (Asher L et al, Vet J, 182(3), 2009)

Table 1

Registrations statistics, number of disorders (including conformational related disorders, C, conformation exacerbated disorders, CD, and disorders not previously linked to conformation, D) and cumulative severity of disorders by breed.

Breed	Total disorders (C + CD + D)	Cs	CDs	Cumulative severity range for Cs	Cumulative severity range for CDs	Popularity rank (number registrations)	Percentage increase in registrations
Bulldog	42	16	2	50–150	9–18	41 (1258)	8.35

Dr Asher et al stated: under the heading ‘**Conformation-related conditions**’. “According to the literature searched, the Miniature poodle, Bulldog, Pug and Basset hound had most associations with conformation-related disorders. Skull shape affected the respiratory disorders to which breeds were predisposed. Brachycephalic (bulldog-type) breeds had more respiratory disorders. Many conditions have been linked with the brachycephalic head shape, including stenotic nares, an elongated soft palate and hypoplastic trachea. Brachycephalic airway obstruction syndrome (BAOS) is a combination of these conditions with a wide range of severity. Breeds predisposed to this condition include Bulldogs”. (Asher L et al, Vet J, 182(3), 2009)

Dr Asher et al stated: “The large head to pelvis ratio in certain brachycephalic breeds (eg the Bulldog) is linked with dystocia. Reduced cranial cavity size is associated with the potentially severe neurological conditions. Conditions associated with small body size and particularly small leg size, include odontoid process dysplasia, shoulder dysplasia, and patellar luxation, which latter can cause lameness, likely to be underreported because luxation may occur only during exercise. Cervical vertebral instability is linked with heavy heads and has been reported in 12 of the top 50 breeds. Type 1 cervical intervertebral disc disease is linked with chondrodystrophic breeds (eg the Bulldog) and is caused by abnormal cartilage growth in the nucleus pulposus. Conditions such as hemivertebrae and spina bifida are associated with selection for screw and curly tail shapes”. (Asher L, 2009)

Dr Asher et al stated: “Many disorders relate to wrinkled skin or excessive skin folds. Dermatitis and pyoderma may not be severe conditions, but they are often recurrent or chronic in nature. Skin-fold dermatitis has a high reported prevalence in Bulldogs. Skin folds may be stipulated in breed standards directly or arise indirectly from the requirement for a brachycephalic skull shape, or corkscrew tails. Entropion and ectropion are conditions of high prevalence in the Bulldog and can co-occur such that the central lower lid is ectropic while at the corners the lid is entropic (producing diamond-shaped eyes). Conformational complications that can affect the normal eyelid structure include a visible third eyelid or a drooping lower eyelid. Two related conditions are trichiasis, with nasal folds or droopy eyelids, and eversion of nictitating membrane, with facial folds and a distinctive stop”. (Asher, 2009)

Dr Asher et al stated: under the heading ‘**Inherited disorders indirectly linked to conformation**’. “Uterine inertia is linked with dystocia. It is exaggerated in breeds with heads that are comparatively large for their body size (eg Bulldogs), since more uterine force is required to expel the puppies. Black or dark brown hair follicular dysplasia and colour dilution alopecia are caused by irregular pigment clumping, which results in areas of weakness. The piebald, extreme white, and merle coat colourations and, often associated, hypopigmentation of the iris are all linked with a series of co-occurring nervous-sensory conditions, including sensorineural deafness, iris atrophy, and microphthalmia, so that dogs with lighter eyes or coats are more likely to be deaf. Also reportedly related to colouration and dilution are urate urolithiasis and cyclic neutropenia”. (Asher L et al, Vet J, 82(3), 2009)

Dr Asher et al concluded: “Every popular pedigree-dog breed has some aspect of its physical conformation that predisposes it to a disorder. By selecting for appearance rather than health, many have become predisposed to health problems. Some breed standards encourage breeders to select for dogs predisposed to disease. Whilst immediate action is clearly needed, the long-term approach must include furthering our understanding of the relations between physical conformation and inherited disorders. The association of some of these conditions with official breed standards and the high maintenance implications of some breed features make conformational extremes an area which needs to be addressed to safeguard the welfare of pedigree dogs in the future”. (Asher L et al, ‘Inherited defects in Pedigree Dogs. Part 1: disorders related to breed standards’, Vet J, 182(3), 2009)

[This paper won the **George Fleming Prize for 2009**, in commemoration of the founder of The Veterinary Journal]

Dr Nicola Rooney (PhD) at the Anthrozoology Institute, Dept of Clinical Veterinary Science, University of Bristol, UK, stated: “Ethical questions have been posed many times, yet the veterinary profession have become desensitised to the welfare issues to such an extent that the production of anatomically deformed dogs, and I add, dogs heavily predisposed to illnesses, is neither shocking, nor considered abnormal. In August 2008, this was partially redressed when the BBC aired a documentary titled “**Pedigree Dogs Exposed**”. It featured key experts and although criticised by some as sensational and unbalanced, the repercussions of have been far reaching: several sponsors withdrew support from the Crufts dog show, and the BBC did not televise the show in 2009. The documentary has served to bring an incredibly important issue into the limelight and to raise public awareness”. (Rooney N, ‘The welfare of pedigree dogs: Cause for concern’, Editorial, *J Vet Behav Clin Appl Res*, 4(5), 2009)

Dr Rooney stated: “The phenomenon of heterosis (hybrid vigour) means that purebreds naturally show less vigour than outbred individuals. Current breeding practices have exaggerated this effect. Today, pedigree dogs appearing in conventional breed shows are required to conform to written breed standards, which in the United Kingdom are owned by the Kennel Club and derived in consultation with several hundred breed societies. Although the vast majority of pedigree dogs will never appear in a show, many dogs are bred by breeders aspiring to produce show-quality animals and whose surplus dogs are sold as pets. Therefore, trends in the show-dog breeding community have major implications for the domestic dog population at large, and decisions made by a minority of breeders have considerable repercussions for the pet-owning public”. (Rooney N, ‘The welfare of pedigree dogs’, 2009)

Dr Rooney stated: “Trends in the breeding of specific breeds have often led to the accentuation of what are perceived, by some, to be desirable traits. In some cases, physical features have been exaggerated to such an extent that they severely limit dog’s quality of life and are likely to cause pain and suffering. The fact that the veterinary literature describes a whole suite of palliative and surgical procedures developed explicitly to counteract these effects is evidence that the problems are of welfare concern. Features that have the potential to cause suffering should be actively selected against, not simply avoided. Decisions on which have the most potential to cause suffering requires range of specialists from various disciplines independent of vested interest in the breeds involved”. (Rooney N, ‘The welfare of pedigree dogs: Cause for concern’, *J Vet Behav Clin Appl Res*, 4(5), 2009)

Dr Rooney stated: “The effects of selective breeding for appearance includes very significantly reduced genetic diversity unevenly spread across the genome. Coupled with ill-advised breeding practices, whereby breeders inadvertently select regions of the genome that contain a disorder as well as the trait they actually desire, this has led to certain breeds becoming especially susceptible to a whole suite of disorders, many of which are acutely painful or chronically debilitating. Selective breeding has contributed to this situation. A dog can be registered with the UK Kennel Club only if the sire and dam are registered members of that breed’s studbook. Hence dog breeds each represent a closed gene pool, and the Kennel Club, breed societies, and the pedigree dog-showing community have formally endorsed the inbreeding of dogs”. (Rooney N, *J Vet Behav Clin Appl Res*, 4(5), 2009)

Dr Rooney stated: “The link between inbreeding and increased disease risks in purebred dogs is well established. In most, if not all dog breeds, genetic diversity is low. There is consequently an increased chance of inherited disorders being manifest in offspring, and it is difficult to eliminate problems without breeding to members of another breed (out-breeding), which is currently banned. Selection for exaggerated features has resulted in dogs that are anatomically restricted and hence unable to behave normally. For example, severely reduced limb lengths may restrict dwarf dogs’ ability to run freely; and breeds with respiratory deformities (e.g., brachycephalic breeds) may be prevented from running without shortness of breath”. (Rooney N, *J Vet Behav Clin Appl Res*, 4(5), 2009)

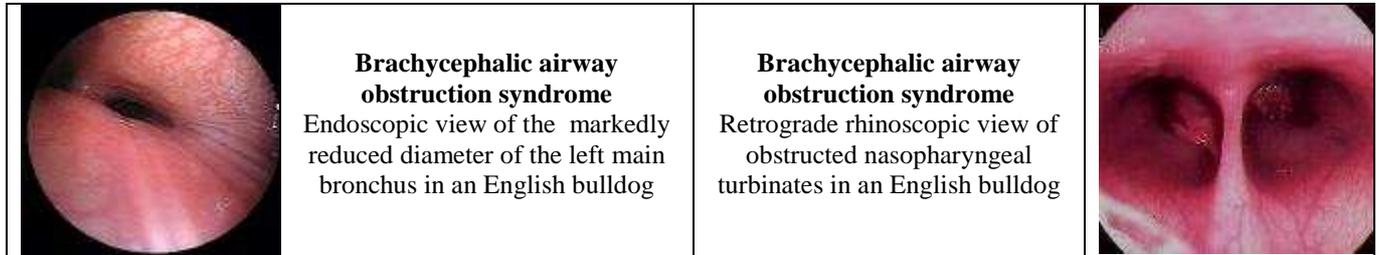
Dr Rooney stated: “In brachycephalic breeds, the skull has been selected to be shortened from front to back, which can restrict the flow of air through the nose. Combined with a comparatively elongated soft palate, this shortened skull can create breathing difficulties and render the dog unable to lead an active life without respiratory distress. Surgical opening of the nostrils is almost routine, and soft palate resection is common. There are many further exaggerated features, including excessive skin folds and screw tails. The English bulldog is a regularly cited example of these morphological extremes and is noted to have locomotion difficulties, breathing problems, an inability to mate or give birth without assistance and physical and surgical interventions”. (Rooney N, 2009)

Dr Rooney stated: “Over the past 130 years, specific physical attributes have been selected for preferentially in many breeds, without sufficient attention to health, temperament, welfare, and functionality. This practice has resulted in two distinct, but interrelated welfare issues:

1. Morphological extremes: anatomical abnormalities that result directly in reduced quality of life.
2. Increased prevalence of inherited disorders as a result of lack of genetic diversity, inbreeding and line breeding and breeding with over-attention to physical attributes rather than improved health and welfare.

Breed standards, management policies, and strategies need to become evidence based. Banning of first-degree matings must be extended to include second-degree matings (between grandparent & offspring or half-siblings)”. (Rooney N, ‘The welfare of pedigree dogs: Cause for concern’, Editorial, *J Vet Behav Clin Appl Res*, 4(5), 2009)

Dr Frederique Bernaerts (DVM), Dept of Clinical Sciences, Faculty of Veterinary Medicine, University of Liège, Belgium, stated: *"An upper respiratory tract disease known as 'brachycephalic airway obstruction syndrome' has been described in brachycephalic dogs. Purebred English Bulldogs are the most commonly encountered breed. The obstruction results from a variety of problems, such as stenotic nares, elongated soft palate, redundant pharyngeal folds and hypoplastic trachea, as well as secondary changes, including everted laryngeal sacculles, laryngeal collapse and aspiration pneumonia. Passage through the nasal cavities accounts for 76.5% of total airway resistance and anatomy of the turbinates may contribute to stenosis in brachycephalic dogs. Indeed, a nasal resistance measured by rhinomanometry of six times higher than normal Beagles has been demonstrated in Bulldogs, where partial collapse of the bronchus is a common finding not previously described, as are epiglottic cysts, laryngeal granulomas and nasopharyngeal turbinates".* (Bernaerts F et al, Vet J, 183(1), 2010)



Dr Frank Nicholas (BSc, PhD), Professor Emeritus with the Faculty of Veterinary Science, University of Sydney, Australia, heads the Inherited Disorders Research Team, which includes **Dr Clare Wade** (PhD), Associate Professor of Animal Genetics and Computational Biology, and **Dr Peter Williamson** (BSc, PhD), Associate Professor of Genomics. In a Veterinary Journal 'Guest Editorial', **Dr Nicholas et al** stated: *"Although the August 2008 screening in the UK of the BBC Television documentary 'Pedigree Dogs Exposed' exaggerated the extent and consequences of inbreeding in pedigree dogs, it made many telling points in relation to breed standards".* (Nicholas F et al, Guest Editorial, 'Disorders in pedigree dogs: Assembling the evidence', Vet J, 183(1), 2010)

Drs Nicholas et al stated: *"The **Kennel Club (UK)** responded across the board: between October 2008 and January 2009, all breed standards were reviewed, resulting in interim changes to the standards of 78 of the 209 breeds under its control. Following widespread consultation, **the KC's revised breed standards became official on 1st October 2009**. Importantly, each revised standard now starts with a general statement advising breeders and judges that they 'should at all times be careful to avoid obvious conditions or exaggerations which would be detrimental in any way to the health, welfare or soundness of this breed'. Also, breeders and judges are encouraged to report any perceived problems to a new 'Breed Watch' section of the Kennel Club's website".* (Nicholas F et al, Guest Editorial, 'Disorders in pedigree dogs: Assembling the evidence', Vet J, 183(1), 2010)

Dr Nicholas stated: *"How can further progress in relation to breed standards best be achieved? An obvious requirement is for a thorough investigation of the clinical implications of breed standards. In Australia, at a public Pedigree Dogs Forum, organised by the Veterinary Science for Animal Welfare Society of the University of Sydney, held in the Faculty of Veterinary Science, University of Sydney on 24th September 2009, following the screening of the BBC documentary in Australia, the President of the Australian National Kennel Council, Hugh Gent, stated that he would 'do everything in his power to facilitate changes to any breed standard that can be shown scientifically to compromise the welfare of dogs'. This is a very constructive challenge to veterinary scientists and others who are in a position to assemble such evidence".* (Nicholas F et al, Guest Editorial, Vet J, 183(1), 2010)

Dr Nicholas concluded: *"Recent work by the Ascher and Summers group (at the Department of Veterinary Clinical Sciences, Royal Veterinary College, Herts, UK) will assist in prioritising disorders for further research and examining the potential effectiveness of any genetic control programme that may be contemplated. Fortunately, there is a readily-available strategy for decreasing the occurrence of such disorders in a particular kennel, namely avoiding the mating of known relatives. The papers by Asher et al (2009) and Summers et al (2010) provide a welcome contribution to the literature on an emotive and important subject. Their extensive documentation of inherited disorders in dogs provides a solid foundation for highlighting and prioritising breed standards that require further modification. The initiative is to be commended. (Nicholas F et al, Guest Editorial, 'Disorders in pedigree dogs: Assembling the evidence', Vet J, 183(1), 2010)*

Katy Evans (BVSc, CertVA, MRCVS) and **Vicki Adams** (BSc, DVM, MSc, PhD, MRCVS) of the **Animal Health Trust**, Suffolk, who conducted a study of the frequency of occurrence of caesarean sections in a large sample of pedigree dogs in the UK stated: *"The **Bulldog** is the only breed in the top five requiring both emergency and elective caesarean section, with a caesarean section birth rate greater than 80%".* (Evans K, Adams V, 'Proportion of litters of purebred dogs born by caesarean section' J Small Anim Pract, 51(12), 2010)

Dr Danika Bannasch (DVM, PhD), Associate Professor of Veterinary Genetics in the Dept of Population Health and Reproduction, School of Veterinary Medicine at the University of California, Davis, stated: *“Each dog breed is defined by a specific combination of morphological traits. Some of the phenotypic traits are associated with medical problems. **Brachycephaly is one of the traits that cause dramatic morphological changes, characterized by severe shortening of the muzzle, and therefore the underlying bones, and a more modest shortening and widening of the skull (eg the Bulldog). Brachycephaly is associated with a number of medical conditions, including breathing abnormalities, cleft palate and lip and (in the Bulldog), also increased risk of gliomas (brain tumors)**”.* (Bannasch D et al, *Localization of Canine Brachycephaly Using an Across Breed Mapping Approach*, PloS ONE 5(3), 2010)

Dr Bannasch stated: *“Despite these serious medical issues, brachycephalic head type dogs have been favored for hundreds of years due to the similarity of their skull shape to that of human infants. With the use of artificial insemination and Caesarean sections that allowed brachycephalic breeds to reproduce (artificially), selection for more extreme versions of this phenotype occurred at the time that the breeds were artificially created and as a result, brachycephaly is now a semi-dominant trait, since phenotypic sharing between breeds ceased around 100 years ago when breed standards were fixed and stud books closed. Two candidate genes for brachycephaly have been identified and regulatory mutations in either could lead to the brachycephalic phenotype”.* (Bannasch D et al, *Localization of Canine Brachycephaly Using an Across Breed Mapping Approach*, PloS ONE 5(3), 2010)

Jennifer Summers (MSc, PhD candidate) and the previously cited Asher team associates (Asher L, Diesel G, McGreevy P & Collins L) at the Royal Veterinary College stated: *“In this second part of a two-part review, inherited disorders which show no link to conformation were researched in the top 50 UK Kennel Club registered breeds. Pedigree dogs have been bred to conform to published aesthetic, but not health-based, standards using closed stud books, selective breeding and the repeated use of popular sires. Such breeding practices have increased the expression of inherited defects and compromised the health and welfare of many breeds”.* (Summers J et al, *‘Inherited defects in pedigree dogs. Part 2: Disorders that are not related to breed standards’*, Vet J, 183(1), 2010)

Summers et al stated: *“The UK Kennel Club (KC) was established in 1873 in response to the growing popularity of exhibiting dogs in organised shows. At that time a stud book was produced as a register of dogs considered to be good breeding stock. Concerns have been raised regarding the level of inbreeding from this original small pool of breeding dogs and subsequent deleterious health effects within canine pedigree breed groups. The inheritance of genetic diseases can be controlled by a single gene (monogenic conditions) or several genes (polygenic conditions). There are four forms of single gene inheritance: (1) autosomal recessive; (2) autosomal dominant; (3) X-linked recessive, and (4) X-linked dominant”.* (Summers J et al, *‘Inherited defects in pedigree dogs. Part 2, 2010’*)

Summers et al stated: *“For a dog to present with clinical signs of an autosomal recessive disease, two copies of the recessive allele must usually be present at a particular gene locus on a non-sex chromosome. Autosomal dominant diseases or traits will present clinically when only a single copy of the gene is present on a given chromosome. Polygenic inheritance is transmission of those conditions or traits whose clinical expression is controlled by several genes and, often, additional environmental influences. Reduced heterozygosity of a highly inbred population can contribute to the frequency of occurrence of inherited disease in the population as the likelihood of inheriting two recessive gene alleles (recessively transmitted disorders) is also increased”.* (Summers)

Summers et al stated: *“In the creation of a breed, an important issue is the ‘fixing’ of desirable features so that an exclusive group of dogs will breed true to type, reliably displaying the features preferred by the breeder. Fixed features are maintained by selective breeding of registered animals. Selection can be made simply on the basis of the phenotypes of individual prospective parents or with additional reference to the familial traits of potential parents’ relatives. In many breeds the former approach has led to the relative overuse of popular sires. **Certain popular, usually champion stud dogs are used extensively and to the exclusion of other registered males, so effectively reducing the number of sires represented in the closed studbook of a particular breed. The effect of ‘fixing’ and the use of popular sires on modern breed gene pools has raised concern**”.* (Summers J et al, 2010)

Summers et al concluded: *“In the top 50 breeds, of a total of 396 disorders, 312 were non-conformational (D), emerging without a link to specific physical attributes specified in the breed standards and inherently unpredictable mutations occurring throughout the genome. The majority display autosomal recessive transmission (71%), followed by autosomal dominant (11%), X-linked (10%) and polygenic (4%). The UK, German shepherd dogs were predisposed to the greatest number of D disorders (58), followed by the Golden retriever (50) and Boxer (45). **The Bulldog had only half that of the top five (24), but 8 times that of the lowest, the Bordeaux (3)**”.* (Summers J et al, *‘Inherited defects in pedigree dogs. Part 2: Disorders that are not related to breed standards’*, Vet J, 183(1), 2010)

Remarkably, the Bulldog had nearly twice as many conformation disorders as non-conformation disorders, indicating the considerable potential to improve the Bulldog’s welfare of via reform of the official standard.

This concludes my review of the published scientific veterinary literature to date (1st Edn April 2010) on the subject of the health and welfare of pedigree dogs, the Bulldog in particular. I have restricted myself to the peer-reviewed literature and limited commentary, to the exclusion of the lay press and public interest material and which former, the non-scientists that are my primary readership target are unlikely to access successfully to the same extent that I have taken the trouble to do in order to form an entirely objective opinion on this important subject.

I have corresponded with most of the author's of and read in their entirety most of the papers and book chapters cited herein, most of which researcher's have personally encouraged my efforts to bring the results of their research and also their appeals for urgent evidence-based reform to a wider audience, and in particular the pedigree dog registry, conformation dog show and breeder and cash-cow veterinary fraternities, who as a whole are shamefully responsible for this appalling state of affairs, and without this humble contribution, would carry on regardless.

In particular, I wish to thank Mrs Julia van Rooyen, Chairlady of the South African Bulldog Club (member, Roseneath Bulldogs); Dr Roy Williams, Chairman, Millennium Bulldog Club (member, Mervander Bulldogs); Mr Neil S. Kay (KUSA judge, Convenor of the National Judging Sub Committee and KUSA spin-doctor; and also Mr Greg Eva, KUSA President and judge, all of whom have spurred me on in my efforts by *actively turning a blind eye to the shame of their actions* and thwarting my efforts to cast light into their and other's darkness.

An e-mail thread with Mr Eva on this topic is posted as a downloadable file on my website here: www.gaiaresearch.co.za/bbkusacorrespondence.pdf and will be updated as and when Mr Eva, on behalf of the Kennel Union of South Africa, has the decency to respond appropriately to my troublesome queries and legitimate demands. This thread, originally between Mr Eva and I, was progressively expanded to include more and more role-players as my efforts were frustrated and is being made available in its entirety as a public domain *name and shame* service to all bulldogs.

What I find particularly shameful is that Dr Williams, on behalf of Mervander Bulldogs, as far as I am aware, the only veterinarian on my e-mail list of role-players for this thread, which includes all of the bulldog breeders that I know of, was the only recipient to cowardly request removal of their e-mail address from my distribution list on this topic, presumably to insulate themselves as major culprits, from criticism of their own role in this shameful matter. Dr Williams, a prominent veterinarian, ought to better respect the oaths taken by veterinarians the world over.

The obligation of veterinarians is to "*protect the health and well-being of animals and animal populations*" and "*not permit himself to be exploited in a manner which may be detrimental to an animal*" (South African Veterinary Council Mission Statement and Rules); and "*protect and promote the health and welfare of animals*" (South African Veterinary Association Credo). Clearly Dr Williams' role as a veterinarian and a key member of Mervander Kennels, the largest English bulldog puppy farm in South Africa, represents rather severe conflicts of interest.

I make this assumption in good faith after having received an e-mail from Dr Williams requesting that I remove Mervander Bulldogs from my e-mail list. Considering their statement on the Mervander website at the time that "*We totally reject the new interim standard approved by the Kennel Club*", I replied as follows: "*Please take cognisance of the fact that I am holding you, your fellow breeders and the KUSA collectively responsible for the ruination and continuing unnecessary long-term suffering of the English Bulldog breed in South Africa. Seeing as these communications serve as notice to all parties to this matter, I regret that I cannot remove you from the distribution list at this time, since that would serve only to unfairly prejudice you and furthermore would be unconstitutional. Ignore the content if you will, but to no avail, other than to prejudice yourselves, since you are hereby being served regarding both my contentions and my intentions and it is clearly in your own interests to keep abreast of developments. Perhaps rather than attempting to avoid the issue that you in great measure have created, you might instead participate in constructive debate and so assist in the timeous resolution of the rather vexing ethical issues arising from this matter*".

I note with interest that Mervander have subsequently somewhat altered course, now stating:

TO WHOM IT MAY CONCERN

For more than 60 years, Mervander has been dedicated to the breeding of healthy Bulldogs and will always support any honest attempt to improve the health of the breed. We will support efforts to eliminate any excessive characteristics as well as deformities like wry jaws, fiddle fronts and sway backs. We consider excessive skin wrinkling, ectropion, entropion and congenital lameness as explicit hereditary health problems which must be eradicated from the breed completely.

A rather more realistic, vastly more extensive list of diseases to which English bulldog's are predisposed is downloadable here: www.gaiaresearch.co.za/bbbulldogdiseasepredispositions.pdf

Clearly some guidance as per this report is timeous if their 60 years has merely produced the long-suffering modern English bulldog. To claim to have been breeding "healthy" bulldogs is absolute nonsense. As witnessed by my evidence-based report, there is no such thing as a "healthy bulldog", not yet, and by rejecting the amended standard, the South African bulldog breeding fraternity will simply never progress to this noble end. The modern pedigreed English bulldog is a barely walking, breathing and reproducing, yet extraordinary repository of genetic afflictions, a cruel, shameful self-indulgence by ignorant human beings, not worthy of that title.

As with Mervander, so too my disgust with KUSA's Messrs Neil Kay and Greg Eva. I cannot ask that the "*Lord forgive them since they know not what they do*"! They cannot be so ignorant of the breeds they administer. In any event, they cannot now, having had sight of this report, continue to justify their perverse warped sense of perfection on another generation of English bulldogs, yet this is what all breeders in South Africa intend to and are condemned to do, if Mr Neil Kay and the KUSA President, Mr Greg Eva, have their way in pandering to these breeders.

Against my unequivocally substantiated evidence-based report, Mr Kay served up and Mr Eva permitted the following deliberate unconscionable misinformation to the gullible KUSA faithful:

"Newspapers of course love an animal story, and so often print emotional and totally untrue accounts of the lives endured by so-called exaggerated breeds of dogs"; "Bulldogs of course are the prime target"; "All very sad, and in the majority of cases untrue. Breed features can be pounced on by an uninformed press and condemned in lucid terms"; "We must be aware of public opinions fuelled by sensational newspaper articles and by various 'anti' organisations"; "Having seen a 'new' standard proposal for Bulldogs, which quite frankly is horrendous, the NJSC (instructed by the president to investigate the whole matter of breed standards and possible exaggerations caused by interpretation by judges) realize just how important judges education is in facing up to the irrational emotions regarding breed features". (Neil Kay, 'The Future of Pedigree Dogs, A Cause For Concern', KUSA Dogs in Africa, February 2010)

My attempts to get KUSA President, Mr Greg Eva to clarify the delay in implementing the U.K. Kennel Club's amended standard for the English bulldog (adopted in October 2009 in the UK), and urgently charter its implementation in South Africa were not well-received and now elicits not even the courtesy of acknowledgements. I have posted that rather long and largely one-sided string of e-mail communication here: www.gaiaresearch.co.za/bbkusacorrespondence.pdf for interested public consumption.

Sincerely,

Stuart Thomson

Director, Gaia Research Institute/Bygones Bulldogs

5 April, 2010

www.gaiaresearch.co.za/bygonesbulldogs.html

director@gaiaresearch.co.za

044-532-7765