Report of the Technical Committee to Enquire into the Welfare of Animals kept under Intensive Livestock Husbandry Systems

Chairman: Professor F. W. Rogers Brambell, F.R.S.

Presented to Parliament by the Secretary of State for Scotland and the Minister of Agriculture, Fisheries and Food by Command of Her Majesty December, 1965

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REPORT OF THE TECHNICAL COMMITTEE TO ENQUIRE INTO THE WELFARE OF ANIMALS KEPT UNDER INTENSIVE LIVESTOCK HUSBANDRY SYSTEMS

To

The Right Honourable WILLIAM ROSS, M.B.E., M.P.,
Secretary of State for Scotland

and

The Right Honourable FREDERICK PEART, M.P.,
Minister of Agriculture, Fisheries and Food

SIRS,

We have the honour to submit the following report on the matters referred to us.

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CHAPTER 1

INTRODUCTION

1. We were appointed by the Minister of Agriculture, Fisheries and Food and the Secretary of State for Scotland at the end of June, 1964:— "To examine the conditions in which livestock are kept under systems of intensive husbandry and to advise whether standards ought to be set in the interests of their welfare, and if so what they should be."

2. We have held meetings on 33 days, on 15 of which we have heard oral evidence. We have visited 54 livestock establishments throughout England, Wales and Scotland. In addition, we visited Denmark, Holland and Northern Ireland in order to enquire into matters which seemed relevant to our study. We have invited the submission of written evidence in the public press and directly from those organisations, departments and individuals known to us to be particularly concerned with matters within our terms of reference. We have invited oral evidence to supplement the written evidence when we considered this to be useful. A list of those from whom we received formal evidence, written or oral, is contained in Appendix I. In addition we received over 250 letters from members of the public expressing opinions and making suggestions. All these were taken into account.

3. Our report relates to Great Britain, but not to Northern Ireland. Our terms of reference do not include transport, slaughter, nor the breeding, as distinct from the keeping, of animals intensively as, for example, by artificial insemination. Antibiotics, hormone and drug treatments and food supplements we consider to be included in our terms of reference in so far as these may affect the welfare of the animals. The effects of such administrations on the animal product as food for human consumption is not within our terms of reference but we have been assured that these important aspects of the problem are being considered by other bodies within whose spheres of responsibility they fall. We reproduce as Appendix VI a note prepared in the Ministry of Agriculture, Fisheries and Food giving information on this subject.

4. First we sought to inform ourselves of the methods of intensive livestock husbandry in use by all means available, including visits of the Committee to representative establishments. These visits were by the courtesy of the owners and were necessarily arranged in advance, since we had no rights of entry to private property. They are listed in Appendix II. We are glad to acknowledge the co-operation of the owners in permitting these visits, and the time and trouble which they expended in making the visits as informative and convenient as possible. We are aware that our procedure has been criticised in certain quarters because it did not include the paying of surprise visits to intensive establishments. We do not accept the validity of this criticism because the purpose of our visits was to educate ourselves, so as to be in a position to appreciate the evidence presented to us and so as to enable us to frame our recommendations on the basis of the conclusions

arrived at in the light of the evidence. We were concerned with learning from these visits the current methods of animal production, not with the discovery of individual malpractices where such may exist. Furthermore, we had amongst our members those thoroughly familiar with the range of conditions in animal production that are to be encountered in this country. We were also able to call on the National Agricultural Advisory Service and on animal welfare societies for help in eliciting additional information about any unusual or extreme form of production.

5. We were aware of the extent of public disquiet concerning the welfare of animals kept intensively and considered it incumbent upon us to report as early as possible. This sense of urgency set a limit to the numbers of intensive husbandry establishments, at home and overseas, which could be visited and precluded our waiting for information, particularly on matters concerning animal behaviour, which could be obtained only by initiating comparatively long term researches.

6. It is difficult to define precisely the term "intensive livestock husbandry". We have considered the keeping of poultry of all sorts, whether hens, turkeys or other birds, entirely within doors on deep-litter, slats or wire or in battery cages; the keeping of rabbits under comparable conditions; beef, veal-calf, sheep and pig production under cover, as falling clearly within our terms of reference. All these methods result in the rapid production of animal products by standardised methods involving economy of land and labour. All are capable of exploitation on a large scale, and units of varying sizes, some very large and some quite small, are in operation. A high degree of mechanisation and automation is a feature of many of the larger establishments.

7. Intensive husbandry is not new. Some traditional methods still in use fall clearly within this definition. We have frequently heard the expression "factory farming", which we understand to relate only to those intensive methods which are of large scale and highly automated. Some witnesses have appeared to draw a distinction between intensive units which are part of a general farm and those which have been developed as separate entities apart from the traditional use of land, sometimes financed by people who have no other interest in farming. In so far as all these are intensive, we have considered that they fall within our terms of reference and that these distinctions are unimportant to us, our concern being with the welfare of the animals, wherever they may be kept and by whomsoever they may be owned. We have not considered the problem of the nuisance to neighbours that may be caused by intensive units, especially when these are in or near built-up areas, nor the sanitary problems involved, except in so far as they concern the welfare of the animals. There may be considerable problems regarding sanitation and nuisance that require examination and possible action by the relevant authorities.

8. A number of factors have contributed to the development and spread of intensive methods of animal husbandry and these we examine in more detail in Chapter 2. Probably the most important have been economic pressures on producers. There can, however, be little doubt that in this country in the foreseeable future the trend towards intensive animal husbandry, with its economy of manpower and land, is likely to accelerate.

Short of prohibition, an extension of intensive systems can be anticipated, involving both a spread and development of existing ones and the appearance of new ones.

9. Historically the evolution of our society has been marked by increasing concern for the welfare of animals. Many cruel practices, such as badger-baiting and cock-fighting, have been proscribed by law. Others, including castration or dehorning of adult cattle, can now be carried out only under anaesthesia. The movement and slaughter of animals for food are controlled in the interest of the animals. Indeed, this Committee was established in response to widespread concern for the welfare of animals under systems of intensive husbandry. It appears to us reasonable to anticipate a continuing development of concern for animal welfare and that conditions which appear to us tolerable today may come to be considered intolerable in the future.

10. We consider, for the reasons set out in the above paragraphs, that our recommendations must, on the one hand, have a flexibility that will permit of a progressive development of sound systems of animal husbandry and on the other, cover the welfare of the animals. Accordingly, we will make recommendations designed to continue and extend the work which we have attempted to initiate. Machinery of this nature would avoid the necessity for too frequent full-scale enquiries, of the kind which we have been called upon to conduct.

CHAPTER 2

THE DEVELOPMENT OF INTENSIVE METHODS

11. Intensive livestock husbandry is part of wider changes that can be discerned in farming in the years since the war. Of the various factors which have contributed to its development and spread probably the most important have been economic pressures. Certain systems, such as the production of white veal and the use of high humidity housing for pigs, stand partly outside this general trend; although there are economic advantages the main reason for the use of the particular method lies in the specialised nature of the end product, or in the attempt to overcome a particular problem of husbandry. But for the main part, where intensification is to be found in the production of major items of food, it is associated with economic forces from two sides. First, production costs in farming, particularly wages, have been rising steadily, as they have in most forms of economic enterprise. At the same time, in the last few years, there have been market forces tending to hold down prices for some agricultural products, including poultry meat, eggs and pig products. These pressures on the farmer have made him increasingly cost and profit conscious and have caused him to put far greater emphasis than ever before on efficiency and business management in farming. The result has been greater sophistication in costing, leading to the standardisation and refinement of methods which are fundamental to intensive production.

12. There has been an accompanying movement towards specialised businesses and away from the interdependence of different enterprises within a single farm. There has also been a move towards larger units and increasing integration so that the producer can obtain advantages in purchasing and marketing and can, by virtue of the greater turnover, accept reduced margins per unit of production. As with other features of intensification, this trend is most noticeable in the poultry industry where, for instance, the June 1963 Census showed that 250 holdings each with more than 20,000 broilers accounted for two-thirds of the national flock. In 1957 there were only just over 50 units in England and Wales with more than 5,000 laying birds; by 1964 the number was nearly 1,000. Over the same period the percentage of the national flock in England and Wales maintained in units of more than 1,000 birds increased from about 14 to 54. Intensification permits of a relatively large turnover from a small site and, in this sense, is economical of land and buildings. Indoor management with a uniform environment, diet and animal strain lends itself to mechanisation, with consequent economy of manpower, but, to be fully successful, it demands correspondingly higher standards of skilled stockmanship. These characteristics of intensification encourage specialisation, both in terms of the kind of animals kept and the methods used. An intensive unit can be housed on a very small area of land, without the necessity of being attached to a farm, provided the food can be bought, and the manure disposed of, economically. Intensification has also proceeded on farms, not only as

a means of increasing the stocking rate and hence the turnover, but also in some cases as the most profitable way of disposing of crops.

13. These developments have been facilitated and encouraged by the application of new thinking and new techniques to food production and marketing. Marketing developments need not concern us save to note that they require, in particular, large quantities of standardised products and that the tendency is to try to make supplies independent of season. As to production, developments have stemmed from scientific research, especially in the field of genetics, where large-scale research and breeding programmes have led to the development of specialist hybrid strains of poultry tailored to the husbandry systems under which they are to be kept and capable of extremely high performance in terms of conversion of food into saleable products. The result has been the virtual disappearance both of the traditional breeds and the small-scale breeder and the dominance of specialist hybrid stock bred by large commercial organisations. Similar developments, already discernible with pigs and sheep, may follow with other stock, but these are likely to take place much more slowly. Rapid progress has been possible with poultry because they mature rapidly and produce large numbers of offspring, advantages which do not apply with cattle, sheep or even pigs.

14. In addition to genetic changes, applied research has had important results in management. Much of this research has been done commercially, in particular by the manufacturers of animal feeding stuffs. The major firms producing branded foods accept as part of their routine sales promotion the task of providing up-to-date scientific advice on production techniques in the same way that the big poultry breeders recommend specific methods for achieving the best commercial results from their stock. These efforts of private enterprise have been paralleled by research carried out in the Universities and through the Agricultural Research Council, the National Agricultural Advisory Service and other organisations. Taken in all, considerable resources have been directed into the development of new farming methods, both of crop and of livestock husbandry, and their effect has been to facilitate the rapid adoption of intensive systems.

15. Though the principal aim of the producer in turning to more intensive methods is to improve profitability, one of the main advantages which such methods offer him over conventional forms of production is a closer and more certain control of the different sides of his management. This is connected with what must be identified as the chief characteristic of intensification ; the rejection of traditional outdoor foraging systems in favour of bringing the food to the stock, housed permanently indoors, often with complete independence of season or weather conditions by the use of artificially controlled temperature, humidity and lighting. Under these circumstances, the food ration has to be complete and properly balanced. When prepared feeds are used their cost tends to be high in relation to other production costs and one of the producer's main endeavours is to obtain the most economic conversion rates. The restraint on exercise and the protection from extremes of climate help in this aim.

16. In order for the rather higher capital costs of advanced housing to be justified it is desirable to maximise productivity ; thus it is that the feeding

regime is intended to bring the animals forward to slaughter weight as quickly as possible or to achieve the maximum production of eggs or milk within the economic life span of the animal.

17. The use of these methods has, as we have said, gone further in some spheres than in others. When we deal with individual species of animals later on, we pay more attention to methods and the reasons for their use. Here, we think it more important to note that the forces which have led to the growth of intensive methods are still at work. There can be little doubt that in this country in the foreseeable future the trend towards intensive animal husbandry is likely to accelerate.

CHAPTER 3

ANIMAL WELFARE LEGISLATION

18. In the early stages of our work we sought to acquaint ourselves with the existing animal welfare legislation. We felt we needed to understand both its general principles and philosophy as they have evolved over the course of the years and the way it applies to the intensively kept animals with which our investigation is concerned. A study of the legislation reveals a steady multiplication of the measures which represents an increasingly humane attitude to animals.

19. The movement to legislate for the protection of animals against cruelty probably began around the end of the eighteenth century though earlier measures had touched on the subject. In 1809 a Private Member's Bill was introduced in the House of Lords by Lord Erskine, intended to provide some legal protection for animals, but it was defeated in the House of Commons. An important landmark occurred in 1835 with the passing of an Act to "consolidate and amend the several laws relating to the cruelty and improper treatment of animals and the mischief arising from the driving of cattle and to make other provisions in regard thereto". This Act set a pattern which was followed in a further consolidating Act of 1849 and so became the basis for the Protection of Animals Act 1911 which is still in force today. The main principle which Parliament accepted in these measures was that, while man is free to subjugate animals, it is wrong for him to cause them to suffer unnecessarily. This principle is clearly laid down in Section 1 of the 1911 Act (and in the corresponding Scottish Act of 1912) which makes it an offence to cause or permit any unnecessary suffering to any domestic or captive animal by the commission or omission of any act.

20. While preserving this general principle of the 1911 Act unimpaired, Parliament has from time to time thought it necessary to buttress it with additional legislation where it seemed that particular practices needed specific control or that certain kinds of animals kept under particular circumstances were in need of further protection. Like the 1911 Act and its predecessors this additional legislation has, for the most part, been introduced in Parliament by private members and it consists of a number of measures. One important aspect concerns practices which expert veterinary opinion believes to cause suffering which can be avoided by some reasonable means. The Protection of Animals (Anaesthetics) Act 1954, as amended by the Protection of Animals (Anaesthetics) Act 1964 requires, in effect, the use of an anaesthetic for the performance of specific operations on farm and domestic animals. There are also measures aimed at ensuring minimum conditions where animals are kept in particular circumstances. These are relevant to our field. We have looked at the Pet Animals Act 1951, the Animal Boarding Establishment Act 1963 and the Riding Establishments Act 1964 (which superseded an Act of the same name of 1939). These Acts are intended to ensure that those responsible for the custody and care of animals are reputable and reliable persons and provide adequate facilities. Enforcement

of the three last-named Acts is in the hands of Local Authorities who have discretion to grant licences for the maintenance of the establishments and are vested with powers of entry for the purpose of inspection. With riding establishments, the Local Authorities must obtain a report from a veterinary surgeon or veterinary practitioner approved by them before deciding whether to grant or renew any licence. As licences are renewable annually this means that such establishments are inspected by an independent veterinarian at least once a year, but the legislation does not provide for uniform or minimum standards.

21. Under the Diseases of Animals Act 1950 the Agricultural Ministers have powers to make Orders regulating the movement of animals, including Orders for the protection of animals from unnecessary suffering during transit. These powers were extended by the Agriculture (Miscellaneous Provisions) Act 1963 to include the making of Orders to cover animals in markets and while being exported.

22. We have not excluded from our study legislation dealing with animals used for laboratory experiments; but this is a specialised field which has been subject to close control and inspection for nearly 100 years and it has been the subject of a separate inquiry recently. Though it has some lessons for us, it stands outside the general field of animal welfare legislation.

23. Despite the steady increase in the number and scope of minor measures to support it, the 1911 Act remains the main pillar of the animal welfare legislation. Its terms are wide and it is possible under them for anyone causing suffering to an animal to be brought to Court. Enforcement is in the hands of the police but proceedings can be initiated by any member of the public who believes that an offence has been committed. The Act does not provide powers of entry upon private premises; most prosecutions, therefore, are brought by the animal welfare societies as a result of their inspectors' enquiries following a complaint from a member of the public who may have seen what he believed to be an offence or may have heard the cries of the animal or animals concerned. It is thus a valid criticism of the Act that it provides no express safeguard for the welfare of animals which are kept on private premises (other than those covered by the minor legislation) which cannot be overlooked or overheard from a public place or from someone else's property. A further criticism of the Act is that action is only possible *after* an offence has been committed; this, it is said, limits its deterrent effect.

24. But, despite these and other criticisms, the Act is still the chief instrument of the animal welfare movement in bringing cases against alleged offenders. To succeed it is necessary for the prosecution to prove to the satisfaction of the Court that the accused knowingly caused or allowed cruelty to occur and that such cruelty was substantial. The Act specifically includes mental as well as physical suffering by the use of the words "infuriate" and "terrify" but it does not mention lesser degrees of mental suffering. It is for the Courts to decide whether or not unnecessary suffering within the terms of the Act has occurred and it is this which presents what is acknowledged to be the greatest difficulty. The problem revolves around the need for the prosecution to produce veterinary testimony that suffering occurred. Clearly there are a great many cases where veterinary knowledge is insufficient to give an unequivocal expert opinion.

CHAPTER 4

THE WELFARE OF ANIMALS

25. Our terms of reference require us to consider the standards of "welfare" of domestic animals that should be regarded as acceptable under systems of intensive husbandry. Welfare is a wide term that embraces both the physical and mental well-being of the animal. Any attempt to evaluate welfare therefore must take into account the scientific evidence available concerning the feelings of animals that can be derived from their structure and functions and also from their behaviour.

26. Nobody can experience the feelings of another individual, however well that person may be known to them. They can be evaluated only by analogy with one's own feelings, from what that person tells us, and from one's own observation of his looks, behaviour and health. The evaluation of the feelings of an animal similarly must rest on analogy with our own and must be derived from observation of the cries, expression, reactions, behaviour, health and productivity of the animal. The better we know a person the more fully we can appreciate his feelings; we cannot estimate those of a stranger as well as we can those of a friend and we are still less able to appreciate those of a person of alien race and culture. We are correspondingly even less competent to appreciate those of an animal, which cannot communicate verbally and whose expression, reactions and behaviour we are much less able to interpret. Nevertheless, our understanding of their feelings is not different in kind, but rather in degree, from that which we form of a fellow human being. Animals show unmistakable signs of suffering from pain, exhaustion, fright, frustration, and so forth and the better we are acquainted with them the more readily we can detect these signs. Judgement of the severity of their suffering must be subjective.

27. There are sound anatomical and physiological grounds for accepting that domestic mammals and birds experience the same kinds of sensations as we do: the structure of a mammal's nervous system is essentially similar to that of man and the function of the ductless glands is known to be comparable. The sensations certainly differ in degree; for example the senses of hearing and smell may be much better developed in some animals than in man. It is probable, however, that imaginative anticipation, which plays such a large part in human suffering, is incomparably less well developed in most animals. They appear to live much more in the present and their suffering to be correspondingly more transitory, although many animals can both remember the past and fear the future to some extent. It is justifiable to assume that the sufferings of animals are not identical with those of human beings; it is equally justifiable to assume that they suffer in similar ways; the valid point where the line should be drawn between these two extremes is very difficult to determine and must be a matter of balanced judgment. It is extremely important to realise this because the whole of our recommendations ultimately must rest on such judgments.

28. The scientific evidence bearing on the sensations and sufferings of animals is derived from anatomy and physiology on the one hand and from ethology, the science of animal behaviour, on the other. We have had before us the findings of the Departmental Committee on Cruelty to Wild Animals (Cmd. 8266 1951, paras. 36–42) and of the Departmental Committee on Experiments on Animals (Cmnd. 2641 1965, Chap. 11 paras. 179–183) and we reproduce the relevant sections of these in Appendices IV and V. One of our members (Dr. W. H. Thorpe), who has expert knowledge of this subject, has prepared a paper for us which we reproduce as Appendix III. Since, in general, we agree with the conclusions regarding the feelings of animals contained in these papers, it is unnecessary to recapitulate the evidence for them here. We accept that although pain, suffering and stress are certainly not identical in animals and men, there are sound reasons for believing that they are substantial in domestic animals and that there is no justification for disregarding them. We accept that amongst domestic mammals and birds there is no scientific evidence that any single species is more sensitive than another. We accept that animals can experience emotions such as rage, fear, apprehension, frustration and pleasure, though they do display different degrees and types of intelligence which may affect the reaction to particular stress-causing circumstances.*

29. We are concerned with the welfare of the animal throughout what may be the duration of its life, whereas the matters of primary concern to the Departmental Committees quoted were mainly of shorter term. We, for our part, must pay special attention to the possible cumulative effect on the animal of the long continuance of conditions which might be tolerable or even acceptable, in the short term. Factors producing prolonged stress, discomfort or deprivation must weigh heavily with us and may, on occasion, be of much more significance for the total welfare of the animal than more acute, but transitory, suffering. Therefore, we have been impressed by the evidence to be derived from the study of the behaviour of the animal. We recognise that the scientific information available concerning the behaviour of domestic animals is inadequate in many respects for our purposes and that much further work in this field is required before we can be satisfied as to their welfare. We are of opinion also that such information could be of great economic value to the industry. We consider that this is a field of scientific research in relation to animal husbandry which has not attracted the attention which it deserves and that opportunities should be sought to encourage its development in this country.

30. Many witnesses have represented to us that the growth rate of an animal for meat or the egg production of a laying hen are the only reliable objective measures of their welfare. It is claimed that suffering of any kind is reflected by a corresponding fall in productivity. The argument is that in the absence of any scientific method of evaluating whether an animal is

* We are impressed by the opinion recently expressed by Lord Brain who said :—

"I personally can see no reason for conceding mind to my fellow men and denying it to animals . . . . Mental functions, rightly viewed, are but servants of the impulses and emotions by which we live, and these, the springs of life, are surely diencephalic in their neurological location. Since the diencephalon is well developed in animals and birds, I at least cannot doubt that the interests and activities of animals are correlated with awareness and feelings in the same way as my own, and which may be, for ought I know, just as vivid."

suffering, its continued productivity should be taken as decisive evidence that it is not. This is an over-simplified and incomplete view and we reject it. It is true that a satisfactory growth or egg production rate is a reliable guide to the welfare of the animal in certain respects—for example that it is being well-fed—but it is inadequate in other respects. Growth, on occasion, can be a pathological symptom, although it is more often a mark of health. Growth rate and condition, as witnessed by a good coat or plumage, alertness, bright eyes and contentedness, taken altogether are a better guide, perhaps the best objective measure available, but are not inconsistent with periods of acute, but transitory, physical or mental suffering. We consider that it is morally incumbent upon us to give the animal the benefit of the doubt and to protect it so far as is possible from conditions that may be reasonably supposed to cause it suffering, though this cannot be proved. Frequently it happens that a given system of husbandry has some characteristics which are likely to operate to the benefit of the animal, as compared to other systems, and other characteristics which are likely to be to its disadvantage and in such circumstances a difficult judgement of the balance of advantages and disadvantages has to be made. Such judgements made on inadequate evidence will require to be reviewed in the future when more information is available. We are very conscious of this provisional nature of some of our recommendations and have taken into account the need of machinery for their review.

31. A principal cause of suffering in animals, as it is in men, is disease. Many veterinary witnesses have drawn our attention to this and to the necessity of taking it into account fully in assessing the welfare of animals. We have been impressed with this evidence and accept the major importance of the disease risk in evaluating the welfare of an animal under any system of husbandry. Accordingly, we lay stress on the incidence of disease and on the guarantees that a sick animal will be quickly recognised and appropriately treated or slaughtered. Any given intensive system of husbandry may, or may not, be satisfactory in one or both of these respects. Some compare favourably with traditional methods with regard to disease, others compare unfavourably. When poultry and pigs are allowed access to an outside run, it is difficult to avoid a steady build-up of worm eggs from faecal contamination, with the rate increasing in periods of warm, damp weather. It has been found that the pig lungworm can only survive in outside runs where the intermediate hosts, several species of earthworms, are present. Once infection is established in a population of earthworms it is very difficult to eliminate it except by resting the land for two years. It is certain that the pig stomach worm survives better outdoors, since serious infections are seen almost entirely in breeding stock kept on "pig-sick" land. In a similar manner, some of the troublesome internal parasites of poultry, such as the tapeworms and gapeworm, require various intermediate hosts which are only available to birds given outside runs. Even roundworms and coccidia, which may become established in birds kept indoors, are very much more effectively dealt with in their free-living forms inside a building than when the soil becomes contaminated. Recent surveys of disease incidence in broilers in this country have emphasised how good husbandry and preventative measures can keep suffering and losses at a very low level in these closely controlled stocks.

32. On the other hand, it is a fact that the recent marked increase in intensively reared beef, especially from animals gathered from a variety of sources, has resulted in a higher incidence of pneumonia and of enteric infections, particularly in young stock. Advances in knowledge of ventilation needs, along with the production of effective vaccines for protection against salmonellosis, are already markedly reducing these hazards. Each system must be considered individually in relation to this very important factor concerning the welfare of the animal. The assessment of any system is complicated further by the part which good stockmanship plays in the quick recognition of sickness in an animal. Hence it is meaningless to try to approve or condemn intensive systems in general on this criterion; an individual judgement must be made on each system as to the balance of advantage in relation to the chief diseases to which the animal is prone.

33. Another cause of acute suffering in animals arises from accidents and attack by predators. These may or may not relate to the system of husbandry. Generally, domestication and increasingly close confinement has tended to reduce, and in many cases to eliminate, attack by predators. Similarly, domestication has probably tended overall to reduce suffering. It has certainly resulted in an injured animal usually being quickly recognised and appropriately treated, whereas the wild animal would have been exposed to a slow death. Yet each system of husbandry has its own hazards, which must be evaluated. Fire risks provide a particular hazard where large numbers of animals are housed in a single building and the possibility of their release in emergency is correspondingly small. Failure of services in controlled environment houses and with automatic feed systems are obvious risks, which an automatic warning device can mitigate. Slippery floors and the chance of entanglement or strangulation in caged or tethered animals are hazards requiring attention.

34. Mutilation is also practised on animals kept intensively. We dislike all such practices in principle. We dislike particularly mutilations which result in a permanent disability, affecting the normal behaviour of the animal and we do not regard such mutilations as permissible simply because they may be judged necessary to counter a defect in the system of husbandry. We are prepared to tolerate mutilation only where the overall advantage to the animal, its fellows, or the safety of man, is unmistakable. In accepting this we assume that all possible means to alleviate the suffering occasioned have been taken, including performance of the operation at the optimum age, with suitable safeguards as to the skill of the operator, and the use of adequate equipment, and of such anaesthetics, analgesics and sterile precautions as may be indicated.

35. Wanton cruelty, through intent or neglect, is a hazard to which the intensively kept animal is no more, and probably is less, liable than any other.

36. Domestication necessarily involves some measure of restraint or confinement, varying from near freedom to close confinement in a cage or stall. Although close confinement of some animals has been traditional, it is characteristic of all intensive systems and it is in them that it is encountered on the largest scale and in the most rigorous forms. The problem is to determine the measure of restraint or confinement which is acceptable for a particular species, or strain within the species, under a given system of management. Confinement is not necessarily undesirable for the welfare

of the animal. It may well confer advantages, notably shelter from the weather and freedom from predators and bullying, three of the major hardships to which the wild animal is exposed. These advantages must be weighed against the disadvantages to the animal. The optimum will vary for each kind of animal, depending on its behavioural urges, and may be different for each breed, age and sex. Some breeds are much better adapted than others to confinement. This is particularly true of poultry, where the application of genetical principles to their breeding has resulted in the production of strains specially adapted to the various large-scale systems of husbandry. Similar principles are being applied, and are likely to continue to be applied, to other animals, though the process of producing highly adapted breeds of domestic mammals is much slower. Hence the kind of animal employed has to be taken into account in deciding the degree of confinement that is acceptable. Close confinement reasonably may be supposed to be less irksome to an individual animal which has been reared from birth under such conditions (though we think it would be wrong to suppose complete adaptability) than to one which has been accustomed to a large measure of freedom and is then closely restrained. Again, close confinement, preventing free exercise and play, may be considered more restrictive on the behaviour pattern of a young animal than on an adult. The degree to which the behavioural urges of the animal are frustrated under the particular conditions of the confinement, must be a major consideration in determining its acceptability or otherwise.

37. Another factor which should be taken into consideration is the duration of confinement. In principle we disapprove of a degree of confinement of an animal which necessarily frustrates most of the major activities which make up its natural behaviour and we do not consider such confinement or restraint permissible over a long period unless the other advantages thereby conferred upon the animal are likely to be very substantial. An animal should at least have sufficient freedom of movement to be able without difficulty, to turn round, groom itself, get up, lie down and stretch its limbs.

38. All farm animals belong to species that have a fairly highly organised social behaviour pattern, either as a family or as a larger flock or herd. Consequently they need companionship and are likely to suffer from solitary confinement. This applies in varying degrees to the different species but is most marked in the ruminants. Companionship also appears to be more important for the young animal than for the adult. This factor requires careful consideration, especially in systems of management involving individual separation.

39. Clearly an animal must be provided with adequate food and drink to prevent it suffering from hunger and thirst. Moreover, its diet should be such as to maintain it in full health and vigour. We do not consider a diet permissible that is known to be deficient in some component or components necessary to maintain the animal in full health, whether or not this leads to an overt pathological condition, nor do we consider permissible the inclusion in the diet of components calculated to upset the normal functions of the animal, except in so far as these may be necessary under veterinary prescription for the prevention or treatment of disease. We have considered antibiotics and other food additives to see what implications

there might be for the welfare of animals. With antibiotics, we conclude that on balance the effects are more likely to be beneficial than adverse; the feeding of antibiotics during the first few weeks of life is sometimes advisable to overcome infection in the young animal. We are satisfied that the feeding of antibiotics as growth stimulants to poultry does not have any immediate effect on the welfare of the individual animal. We are unable to express an opinion on the question of long term indirect effects but we understand that this problem is under review by the competent authorities. The feeding of synthetic oestrogens is no longer generally practised, though pellet implantations are used in some poultry (not broilers) and to a lesser extent in beef cattle and fattening sheep. We do not think the practice has adverse effects on the welfare of the animal. Mineral additives are sometimes used in animal feedingstuffs as growth stimulants or with the intention of correcting existing deficiencies. We feel some concern over this practice; negligence or misunderstanding in the use of such feedingstuffs can cause suffering. We recommend that the quantities of mineral additives in manufactured feedingstuffs be clearly stated on the container. We further recommend that the feeding of arsenical compounds to stock should be prohibited save on veterinary prescription for treatment.

40. We consider that the floors of buildings or cages should be so constructed that the animals can stand, move and rest in reasonable comfort. The animal should be able to feel secure when it is on its feet. The floor should not be such as to produce undue strain on the legs or feet or to result in malformation of them.

41. Ventilation becomes increasingly important with higher densities of animals housed and may be of critical effect on their health and comfort in many systems of intensive husbandry. In houses where the heating or insulation is inadequate there may be a tendency to reduce the ventilation below the limit of adequacy for the purpose of maintaining the temperature. Failure of the ventilation system where it is mechanical can be disastrous to the animals. An automatic warning system for drawing attention to such failure is desirable, as we have stated in paragraph 33, together with provision for emergency ventilation.

42. Where large numbers of animals are concentrated in buildings the possibility of death, panic and suffering should fire occur is very much increased. We believe this is a factor which needs to be borne in mind in the design of buildings, not only as regards the reduction of fire risk and the provision of appliances, but also as regards evacuating the animals should fire occur. In those cases where planning permission has to be obtained for farm buildings the question of fire risk is examined by the competent local authorities, but there are many intensive buildings which do not come within planning control.

43. Environmental temperature is particularly important to the animal when it is confined and cannot take exercise to warm itself or move to a cooler place. Animals thrive best in a comparatively narrow temperature range about the optimum, which varies from species to species, from breed to breed, and according to age. Careful attention needs to be paid to extremes of temperature, particularly for some species under certain systems of management to which we will refer.

44. Lighting affects the animal's welfare both directly and indirectly. Animals are adapted to the alternation of day and night and they should have a reasonable period of illumination each day and a reasonable period of darkness to rest. The requirements of the species vary according to whether they are diurnal or nocturnal in habit; for example, the pig in the wild state is at least a partly nocturnal animal and the domestic pig is probably contented with less light than other domestic animals. The intensity of illumination is probably less critical, since most animals have considerable powers of adaptation to light intensity, but it should be at least adequate to enable the animal to move about and feed in comfort. Some witnesses have represented to us that it is a hardship for the animal to be deprived of sunlight or daylight and exposed only to artificial light but we are not satisfied of the validity of this claim and consider that the intensity, rather than the source of the illumination, is the operative factor. Animals in confinement tend to be quieter and less excitable at low intensities, hence the tendency to reduce the illumination in some intensive systems of management. It is essential, however, that adequate illumination should be available for proper routine inspection of all the animals. Such inspection should take place preferably at least twice a day and never less than once. We are not prepared to tolerate any system where such inspection is likely to be ineffective in recognising sick or injured animals, either through inadequate illumination, over-crowding or any other cause.

45. Most animals kept in confinement are liable to develop undesirable habits or " vices " and these tend to be particularly prevalent under the dense stocking rates of intensive systems. The most common cases are fighting, bullying, feather-picking and cannibalism, tail and ear biting and, with calves, navel sucking. Such vices can result in acute suffering for the victims and measures need to be taken to prevent or minimise them. Sometimes these vices are encouraged by particular systems of management, or by bad stockmanship and can be reduced or eliminated by correcting the faults in management, or by utilising a more tractable strain. At other times they can be eradicated by culling the culprits; but they require to be taken into consideration in judging the merits or defects of most intensive systems.

46. Above and beyond all these matters, important and relevant though each is, stands the fact that modern, intensive animal production methods most markedly increase the responsibility of those who use them towards the animals in their charge. If any creature is wholly and continuously under control, we believe that this total human responsibility must be acknowledged, and that there is widespread public concern that it be seen to be acknowledged. Changing patterns of husbandry may mean varying degrees of frustration and discomfort to animals whose normal patterns of behaviour are still imperfectly understood. We are certain that a beginning must be made to safeguard their welfare. This we attempt in what follows.

CHAPTER 5

DOMESTIC FOWL

47. The fowl has been domesticated for at least 4,000 years and has been subject to human selection for so long that it is difficult to be sure of its precise origin. It certainly comes from the wild jungle fowl of India and Burma and probably from the Burmese Red Jungle Fowl. Despite the large number of specialised breeds that have been produced and the speed with which in recent years the application of genetical principles to breeding has resulted in the production of hybrids specially adapted to high production under intensive methods of husbandry, the behaviour pattern of the modern bird remains essentially that of its wild ancestors. It is still a bird of gregarious habits, that establishes and maintains a high degree of social order within the group, the members of which can recognise each other and communicate vocally. Although the birds spend most of the day on the ground scratching and hunting for food, they can and do fly. Even the modern hybrid can fly and will do so if the situation requires it, contrary to some assertions we have heard. Maternal care for, and instruction of, the young is highly developed.

48. There are more poultry on our farms than any other form of livestock. The agricultural census of June 1965 showed the poultry flock in Great Britain to number nearly 100 million. The laying stock consisted of about 45 million, of which probably 80 per cent. were kept under systems that can be regarded as intensive. There were about 27 million table birds, nearly all broilers. The total annual value of output of poultry products in 1964–65 was about £230 millions, exceeding that of pigs or sheep and being less in value only to milk, and fat cattle, among farm produce.

Laying Hens

49. Until the Second World War, the large-scale management of poultry, as distinct from that of barnyard birds, was on free range or semi-intensive systems. Hence these have come to be regarded as " traditional ". Normally the birds had a house, in which they could be shut up at night or in bad weather, and had free access to a run of variable size and type. This area often was too small in relation to the number of birds using it and was liable to become very dirty and muddy in wet weather. It was likely to become a chronic source of infection by internal parasites unless rested and the birds moved frequently to new ground.

50. This system of husbandry, characterised by the birds having access to the open air, has been largely superseded within the last 30 years by more specialised and intensive methods in which the birds are kept permanently housed. Today about 85 per cent. of the eggs consumed in Great Britain are produced from indoor flocks. The remainder are from flocks that are commonly called " free range ", the management of which has changed little from pre-war days and which is still open to the same objections.

51. Intensive systems of egg production fall into two main categories; those using battery cages and those in which the birds are loose housed, predominantly on deep litter but occasionally entirely on wire mesh or slats or a combination of these. The battery system was known in both the U.S.A. and in England as early as the 1920s but it did not develop on a significant scale until the post-war period. However, it did find limited popularity with specialist poultry keepers, who believed that with correct nutrition and expert management the system could be successful. The advantages claimed were that by eliminating the peck order it increased production from the less aggressive birds, and that it made possible the identification and culling of the poor layers.

52. It was not, however, until the late 1940s that the battery cage achieved any wide recognition among poultry keepers. When it did, the usual practice was to keep the birds in single cages and it was fashionable for mechanical feeding and watering to be installed. Thus the capital costs per bird housed tended to be high. The advent of new, high-performance hybrid strains of laying bird, weighing rather less than the traditional breeds, led to a reduction in capital costs. Particularly, when it was realised that more than one bird could profitably be kept in one cage, the capital outlay per bird housed became far more attractive. This innovation came in the mid 1950s and since then the system has steadily expanded at the expense of other systems. At present 35 per cent. of our birds are kept in battery cages, almost invariably with more than one bird per cage. The trend towards increasing numbers per cage has continued, especially in the last five years, and it is now common for three, four or more birds to be kept together. This has been accompanied by a steady reduction in the space allowed per bird. The original pre-war design of cage gave the bird of those days which weighed about 6 lb., roughly 2 square feet of floor space. With the use of multiple cages and smaller breeds weighing between 4 and 5 lb. producers now think it profitable to reduce the allowance per bird to as little as $\frac{1}{2}$ square foot. This is the commonly accepted minimum below which it is believed that overall performance, and thus profitability, will fall.

53. In the early 1940s loose housing with deep litter developed from the systems used mainly in the U.S.A. The intention was to simplify the cleaning out of the house with consequential saving of labour. The system was introduced into Great Britain around 1947 and spread rapidly, one of the main factors being the relative cheapness with which premises could be converted for the purpose and the high capital cost of the battery cage at that time. Today nearly half of our laying stock is kept under loose housing systems.

54. Loose housing involves two great practical difficulties in management. The first is the risk of so-called "vices", feather picking and cannibalism. The second is concerned with the litter itself where the deep litter system is used. Often the necessary materials, straw, sawdust, wood-shavings or chippings, may be difficult and expensive to obtain with a consequent necessity to economise. In addition, if conditions are such that the litter becomes wet, resulting in the build-up of disease, serious losses can occur. Some producers use completely slatted or wire floors for large colonies of birds in order to overcome this difficulty. The droppings fall through to a pit

or the floor and build up, to be removed at long intervals. These modifications are not generally accepted as successful. Defeathering is common and probably a manifestation of the stress factors which frequently result in lower production.

55. Intensive systems of egg production have figured largely in the evidence which has been presented to us. This was to be expected, both because the poultry industry represents the most highly developed form of intensification in farming at present and because of the wide use of the battery cage, which many people find repugnant. Some of the evidence we have considered from organisations and individuals interested in animal welfare has advocated the complete banning of intensive poultry systems and a return to free range. Other witnesses recognised this as impracticable from the economic point of view, from the land use aspect, and of doubtful advantage for the welfare of the animals, but some of these expressed a strong preference for deep litter rather than batteries. We accept that it is no longer practicable to resort to free range systems; and we believe that, subject to the conditions and improvements which we shall recommend, the intensive systems cater adequately for the welfare of the animals. Accordingly we have directed our efforts to comparing the intensive systems and deciding how these could be improved.

56. Criticism of the use of the battery cage has recurred on a number of occasions in the submitted evidence relating to laying poultry. We have already expressed our disapproval in principle of caging or close confinement of an animal for long periods. (Paragraph 37.) It was incumbent upon us, however, to enquire fully into the advantages and disadvantages of the system. The only acceptable alternative and the only one that could provide for egg production on the requisite scale to meet the national demand is the loose housing system, so that reduction in numbers of battery hens would in all probability tend to be compensated by a corresponding increase in hens under loose housing. Our recommendations must rest, therefore, on a judgment of the relative merits of these two systems as practised at present and as they might be if the modifications we envisage were adopted.

57. First, it must be noted that the degree of confinement to which the battery hen is subjected is extremely close and imposes strict limitation of the normal behaviour pattern of the bird. Cages containing two or three birds and measuring 12–14-inches wide and 17 inches deep are commonly used. Under such circumstances the birds cannot stretch their wings, move without touching one another or stand fully upright at the rear of the cage. Several of our witnesses have pointed out that it is illogical that the domestic hen should be excluded from the provisions of the Protection of Birds Act 1954, which prohibits the keeping of birds in cages where they cannot stretch their wings.

58. Much of the ingrained behaviour pattern is frustrated by caging. The normal reproductive pattern of mating, hatching and rearing young is prevented and the only reproductive urge permitted is laying. They cannot fly, scratch, perch or walk freely. Preening is difficult and dust-bathing impossible. On the other hand, it has been represented to us that in the conditions of controlled environment, ample food supply, and freedom from

predators and external parasites the bird does not need or desire to behave in this way. We do not find this an entirely convincing argument. We accept the view that domesticated strains in general, and certain strains in particular, are much better adapted to caging than their wild ancestors would be, and doubtless suffer correspondingly less frustration, but we believe that the basic behavioural urges are there, though they may not be so compelling and the stimuli that would normally evoke them may be eliminated to a large extent. The caged bird, which is permitted only to fulfil the instinctive urges to eat and drink, to sleep, to lay and to communicate vocally with its fellows, would appear to be exposed to considerable frustration.

59. In view of this catalogue of criticisms loose housing may appear, at first sight, greatly preferable to caging. A well run deep litter house seems to be comfortable for the birds. They are free to exercise their legs and wings, to preen and they can occupy themselves by scratching in the litter in search of food and by dust-bathing. However, the deep litter system has two major disadvantages.

60. First, it is of utmost importance, but in practice not easy to achieve, that the litter on which the birds stand should at all times be dry. This is the crucial factor in the management of a deep litter system and it is essential that the type of litter and the ventilation and stocking of the house should be such as to ensure that the litter never becomes sodden. It is, of course, particularly difficult to achieve this in those parts of the country where the climate is humid. If there should be a failure in maintaining the litter in good condition, the risk of disease, in particular of coccidiosis, becomes serious.

61. Secondly, the bird is not provided with protection from its fellows. Unfortunately, there is no simple and humane way at present of ensuring that stress will not be caused as a result of the social order under loose housing systems. The phenomenon of the peck order is well known and has been investigated by many scientists. It is known to be a major feature of the social life of the fowl and depends on the ability of the individual bird to recognise large numbers of its fellows. A group of birds institutes a strict social order within which each member knows its own position; it knows which of its fellows it must avoid and which it can itself browbeat with impunity. The establishment of this social order takes place soon after a number of birds are put together, by means of a series of individual conflicts which may sometimes go as far as actual battle but more generally are contests of will terminated by the retreat of the inferior bird. Under natural conditions and free range, once this order is established the inferior fowl will always avoid conflict or will flee from an attack by a superior bird. But with intensive loose housing, escape or avoiding action is often impossible; inferior birds suffer stress which may be reflected in performance, and are sometimes injured.

62. It is on the basis of these considerations that we have had to decide whether or not to accede to the wishes of the many individuals and organisations that have urged the abolition of the battery cage. This is the most difficult of the problems we have had to resolve and one to which we have given prolonged and careful consideration. The problem is to determine the balance of advantage for the bird.

63. Our conclusion is that, in the light of present knowledge, a modified battery system may be as good as or better than loose housing. This is a decision which we make with some reluctance; but the facts at our disposal do not justify the conclusion that at this moment in time the battery cage should be prohibited. Deep litter is the only practicable alternative and the risks to the bird inherent to this system, as it exists today, in our judgment are as great as the deprivations of the battery. Furthermore, the modification of the battery system to ameliorate its more objectionable features is attainable in the short term more readily than with deep litter. It is, in our view, absolutely essential that further research work be put in hand forthwith specifically on the behaviour of the battery hen under the new conditions. It is equally urgent that research be undertaken with the object of improving the deep litter system so that it may, as soon as possible, become a safe and secure alternative method. In the light of this work and any further developments in this field, we recommend that the use of the modified battery be kept under review by the statutory Farm Animal Welfare Standing Advisory Committee (see Ch. 11).

Battery Cages

64. Our recommendation that the battery cage system should be permitted to continue for the time being is conditional on certain basic standards being applied to it. These would, we believe, mitigate the more objectionable features of the system which are found at present, particularly in its most extreme forms.

65. Both from our own observations, and from a study of the evidence before us, we believe that the condition of the birds is likely to be satisfactory where there are no more than three birds in the cage. There appears to be the possibility of cannibalism, although the evidence for this is conflicting, when there are four to six birds in a cage, and above six birds per cage there is ample evidence to show the existence of a peck order leading to stress and injury. We recommend that cages for laying poultry should not contain more than three birds.

66. The welfare of the bird in a cage is closely related to the amount of space which it enjoys. A treble cage appears to us preferable to a single one because even though there may be less floor area per bird, the total amount of room available to an individual bird is greater. We do not consider this sufficiently important to justify a recommendation that single and double cages should be prohibited but we think, generally speaking, that double or treble ones are preferable to single ones. In practice, the single bird cage is only rarely used nowadays. In considering the numbers of birds which the cage should contain we have also borne in mind the necessity of adequate inspection. We believe that with batteries inspection is easier with fewer birds per cage and we consider that above three it becomes increasingly difficult to ensure that each bird is carefully looked at once or twice daily.

67. The dimensions of the cage should be sufficient to enable the bird to stand upright at the point where the roof is lowest and to stretch a wing comfortably. We recommend that the three bird cage should measure not

less than 20 inches wide and 17 inches deep and have an average height of 18 inches with the lowest part not less than 16 inches. For two birds the width should be 16 inches and for one bird 12 inches; the other minimum dimensions should be the same in both cases.

68. The construction of the cage is also of considerable importance to the comfort of the bird, particularly the floor, which in present installations is often unsatisfactory. The floor of the cage should be such that the bird can stand comfortably. In our opinion this precludes the use of fine gauge wire netting of a hexagonal pattern which the bird's foot is not well adapted to grip. Fine gauge wires have the additional disadvantage of sagging beneath the weight of the bird, thus throwing increased strain upon its foot. We recommend that the floor of the cage should consist of metal mesh of a rectangular pattern. The gauge should be no finer than No. 10. A sloping floor is an essential feature of the battery cage, enabling the eggs to roll forward to the collecting tray; the incline commonly used is one inch in five. It has been argued that this is uncomfortable for the bird and it is probably true that with unsatisfactory floors this does increase the strain. But with the specifications we suggest we consider that the bird should be able to keep a satisfactory footing on this gradient.

69. The design of purpose built battery houses is still being improved in the light of experience. Many of those in use are ill-fitted to the purpose. Faults are even more apparent in many converted buildings. Increasingly competitive markets have tended to result in too many cages being squeezed into a building and too many birds into each cage.

70. Ventilation is a vital factor in the welfare of intensively kept poultry, as in all intensive systems of animal husbandry, and is, perhaps, even more critical with deep litter systems of poultry husbandry than with batteries. Birds require a relatively large supply of fresh air in proportion to their body weight and inadequate ventilation is a potent predisposing factor for respiratory diseases, to which intensively kept fowl are prone. The optimum varies with climatic conditions but, with mechanical ventilation, the accepted standard amongst good managers at present is to have plant capable of regulation up to a rate of two cubic feet per minute per lb. liveweight housed and it seems to us that this is a suitable specification.

71. We have also been disturbed in studying existing battery systems at the lay-out of the tiers of cages. It is not uncommon to find tiers of four cages, one above the other on either side of a three or four foot gangway in a dimly lit house. Under these circumstances, the birds in the lower tiers often receive much less light than their fellows and their outlook is very limited indeed. The birds in the lowermost tier are difficult to see and this tends to deter efficient inspection of these cages.

72. The stepped or Californian system, where the cages are ranged in steps above a central dropping pit, appears to be a much more acceptable arrangement than vertical tiers. This gives the birds more light and a far more favourable outlook and it enables stockmen to carry out their duties satisfactorily.

73. We do not consider that we would be justified in recommending the abolition of vertically tiered cages although we prefer the Californian system.

We recommend that vertical tiers should be modified to meet our objections and this would be achieved if it were made mandatory for the gangway in front of any vertical tier to be at least two-thirds as wide as the tier is high and for the floor of the bottom cages to be at least 12 inches above the floor level of the gangway. We recommend that tiers be limited to not more than 3 cages above any one level because we consider this is the maximum which can be adequately inspected.

Deep Litter

74. Properly managed, the deep litter system of loose housing is a good method of housing poultry. We have been assured that in competent hands it can be commercially viable in competition with highly intensive battery cages. Unfortunately, when the deep litter system fails, usually for one of two reasons stated earlier, the resultant suffering is likely to be more extensive than with the battery cage. Although we propose to recommend certain standards for deep litter, we should say at the outset that much of the argument revolves around the effectiveness of management; good management is far more important to success with deep litter than is the case with batteries. Many producers have admitted to us that a potent reason for their changing from deep litter to battery cages has been the difficulty of getting skilled labour. Our intention in setting standards is to provide the circumstances in which satisfactory conditions for the birds can be achieved with average management.

75. Some expert witnesses have told us that it is possible under the deep litter system to avoid pecking and cannibalism without resorting to de-beaking. We have seen well-managed deep litter houses in which de-beaking was found to be unnecessary.

76. It is essential both that the standard of management should be adequate and that the housing and facilities should be properly designed and maintained. The ventilation must be adequate and uniform. The food must be sufficient, correctly balanced and readily accessible to all the birds; the food troughs and watering points must be sufficient in number and properly distributed. Other aspects of the lay-out, for instance, the height and siting of the nest-boxes, and the arrangement of any raised slatted or wire-floored area in relation to the rest of the facilities, can be of crucial importance.

77. It is commonly recognised that cannibalism can be prevented or limited by a reduction of the light intensity in the house. We understand this approach but we would not want our recommendations to result in the general adoption of dim lighting and we believe that there are other effective means of avoiding cannibalism.

78. The breed or strain of bird also plays a major part in the avoidance of vice. Certain light weight hybrids are known to be more nervous and prone to pecking than heavier varieties. Docility is recognised as one of the economically desirable characteristics by some breeders and progress is being made in the production of strains which combine it with other desirable qualities. Yet, there are many excitable and vice-prone strains in use and it is evident that genetic improvement in this will take time.

79. The amount of space per bird allowed under deep litter systems has a great bearing on the success of the unit and is relevant, both to the

avoidance of vice and to the maintenance of satisfactory litter. We recommend that a space allocation of 3 square feet per bird is the minimum which should be allowed where the flooring is deep litter alone. Where part of the area is wire-floored or slatted this should not exceed one-third of the total and the minimum allowance overall should be $2\frac{1}{2}$ square feet per bird.

80. Ventilation is the other important factor in maintaining dry litter but it is difficult to suggest hard and fast standards. Where ventilation is entirely mechanical the capacity should be sufficient for a rate of 2 cubic feet per minute per lb. liveweight housed, but mixed systems or totally natural ventilation are frequent with loose housing. Rather than specify detailed standards, we submit that excessively damp litter should be regarded as evidence of a faulty management and that the system requires overhauling.

81. Loose housed colonies on wire floors, or wholly slatted floors, which we mentioned briefly in paragraph 54, have not generally proved successful, despite their apparent attractiveness in labour saving. Although stock can be housed at greater densities than in deep litter, in practice returns tend to be diminished, probably because of frustrations and social stresses not occasioned by the latter. We see little to commend in this form of housing. It seems almost impossible to run successfully without de-beaking and we have no hesitation in recommending that loose housing on wire floors should be prohibited.

82. The lighting of poultry houses of all types is of great importance for efficient inspection of the birds. We recommend that the provision of lighting in the building bright enough for all the birds to be seen clearly for this purpose should be mandatory.

83. It is now quite common for a single stockman to be responsible for as many as 10,000 or more birds. The consequent saving in labour has been brought about by standardisation and mechanisation. This trend is not in itself objectionable but we think it important that certain inherent dangers should be recognised. We believe that all stock should be inspected at least once a day, and preferably twice, and that this should be the standard management practice of all poultry keepers.

84. We are concerned about the risk of mechanical failure in very large, highly mechanised and controlled environment houses especially. We think attention should be given to two aspects of this, depending on the size of the unit concerned. Firstly, we think it important that provision should be made for break-down of the supply in all units totally dependent on electrical power. There are available simple cut-out alarms which could be installed and which provide warning to the producer when his electric current has failed. Provided there is warning, the necessary services could be provided manually in the event of mechanical failure in many units, and evidence that this can be done with the resources available should be required. Otherwise, especially with large houses containing great concentrations of stock, where the labour and other resources available are inadequate for such an emergency, we think the provision of stand-by plant to be of the greatest importance.

85. Windowless houses are common and, though many find them aesthetically unattractive, we have no evidence to support the argument that

lack of sunlight is deleterious to the well-being of the bird. Nor do we find that the practices of artificially adjusted day-length are harmful. It has long been common in egg production to give the birds a greater daily period of illumination at certain times of the year than nature provides. Research has shown that egg production is enhanced during the spring and it is on this basis that many producers subject the birds, upon coming into lay, to a simulated spring in which the day-length is gradually increased from about 12 to a maximum of about 17 hours. We see no reason why this artificial spring should affect the welfare of the animals any more than a natural spring.

Broilers

86. The broiler industry is the most highly integrated of all the systems we have considered and, largely because the industry is dominated by contracts which specify standards for housing, feeding and management, there is very little variation in techniques between one producer and another.

87. The industry began in the U.K. in the early 1950s and expanded rapidly after the abolition of rationing of animal feeds in 1953. In the early stages of this expansion there were large numbers of small units and management standards were highly variable and often poor. Now it is a most competitive business and in recent years this competition has been the cause of rapid integration. The number of units has been reduced to about 2,000 in all and there are very few with a capacity of less than 5,000 birds. Though a general improvement in the standard of management has occurred during this period, with recognition of certain basic minimum requirements for the system to be successful and with the disappearance of many less skilled producers, it has been accompanied by some reduction in the floor space per bird.

88. The industry is based on high energy diets and the very favourable food conversion rates over the first three months. The preferred type of housing is similar to that commonly used for loose-housed deep litter laying poultry. The litter need not be so deep as with laying birds in view of the shorter time period involved. Complete and close control of light, temperature and humidity is normal. The average life of a broiler is 60 days to slaughter, at which stage the liveweight is about 3·3 lb. for females and 4·3 lb. for males. The normal floor space allocation is about 0·7 square feet per bird but variations either way are found and lesser amounts can be commercially successful. Some producers in particular circumstances find it preferable to allow a greater area per bird, perhaps one square foot, which results in improved growth and a better finished bird commanding a higher price. The birds normally spend the whole of their life-span after the age of a few days in the same quarters. They are retained under brooders for the first few days but they soon range throughout the house. They are normally given ample facilities for food and water. Bright lighting is provided continuously at first but this is gradually reduced in intensity and a diurnal pattern introduced. Despite elaborate precautions, these highly intensive housing conditions carry inherent disease risks and the feeding of antibiotics and coccidiostats is routine practice.

89. The whole system is very far removed from the natural but we do not find it as objectionable as some other forms of intensive husbandry. We should point out, in particular, that the mortality rate is very low indeed and that in many ways these birds are better looked after than other forms of livestock. Indeed, the first few weeks of their lives are spent under relatively good conditions but by the time the birds are approaching slaughter size they have little room and conditions may have deteriorated.

90. We consider space per bird to be the most important factor in their welfare. This has been steadily reduced since the industry began. We recommend that a minimum standard should be laid down and that for each bird above the age of six weeks there should be at least 1 square foot of floor space.

91. Suffering can also occur as a result of inadequate management, by a breakdown in services or by a panic or stampede resulting in the suffocation of some birds. We do not believe such accidents are common but the recommendations in paragraph 84 apply equally here.

92. We also consider that cruelty arises amongst broilers in certain fields outside our terms of reference. The first occurs in the collection, packing and transport of the birds to the slaughterhouse. This is a matter which should be dealt with effectively under the existing legislation but the evidence available to us suggests that it is not. The second is in the slaughterhouse and we believe that legislation to compel efficient stunning would remove our anxieties on this score. We hope our views will be noted in the proper quarter and that action will be taken.

De-beaking

93. We have paid a great deal of attention to the subject of de-beaking. Many witnesses have commented upon this practice but we have been surprised at the inadequacy of physiological knowledge on which many of the comments have been based.

94. De-beaking is a mutilation which has been resorted to for the purpose of preventing feather-picking and cannibalism to which fowl, and particularly those of certain strains, are prone. This vice may occur under any system, but is seldom a serious problem when the victims can take appropriate avoiding action and have room to get away from the bullies, as they have on free range. It is in intensive systems that it is liable to assume serious proportions, and may cause the victims intense suffering, as well as resulting in serious losses to the farmer. It is often particularly serious in some loose housed flocks of laying birds and in multi-bird batteries. It is much less common with very young birds, so is much less of a problem with broilers than with layers or breeding birds. It can be rare with some strains and under some managements and common in other cases. It does not appear to occur when not more than two or three birds are caged together and it can sometimes be controlled by different management. De-beaking is a preventative measure that has come into common use with the development of intensive systems.

95. The normal practice is to cut through the upper mandible of the bird one third of its length back from the tip to the feather line, using an electrically-heated cauterising knife in order to prevent bleeding. The

operation is completed by touching the tip of the lower mandible with the flat of the hot knife blade. It has been represented to us that when correctly performed this operation does not cause the bird any pain.

96. To deal first with the question of correct performance of the operation, this in itself seems highly difficult to guarantee. As a routine part of poultry management it is not a task normally undertaken by skilled operatives; often, after a brief demonstration, a farm hand is given the instrument and left to learn by trial and error how best to perform the operation. A single worker may de-beak 1,000 or more birds in a day and we are in no doubt that in a significant proportion of cases the operation is not correctly performed and, either the cut is made at the wrong point (occasionally the beak is cut back nearly as far as the nostrils) or in the process the bird is mishandled and so frightened as to be subjected to considerable stress.

97. Irrespective of whether the operation is performed competently, and in the way that meets with the general approval of the poultry industry, we are convinced that it causes considerable pain lasting for much longer than the second or so that the operation takes to perform. It has been frequently represented to us, and is frequently voiced in public, that the operation is similar to the clipping of the finger-nails or toe-nails of humans. There is no physiological basis for this assertion. The upper mandible of the bird consists of a thin layer of horn covering a bony structure of the same profile which extends to within a millimeter or so of the tip of the beak. Between the horn and the bone is a thin layer of highly sensitive soft tissue, resembling the quick of the human nail. The hot knife blade used in de-beaking cuts through this complex of horn, bone and sensitive tissue causing severe pain.

98. We have, in any case, the further objection that de-beaking deprives the bird of what is in effect its most versatile member. We recommend that de-beaking should be prohibited as soon as possible for all birds which are to be kept in battery cages and we are satisfied that the standards which we advocate will obviate the need for this mutilation by removing the danger of cannibalism under this system of husbandry.

99. In order to control outbreaks of vice, we conclude with reluctance that de-beaking of birds kept under deep litter systems should be permitted for a limited period. We consider that this period should be as short as possible and we hope that two years from the publication of our report will be sufficient time to allow for suitable strains to be in adequate supply and for poultry keepers to adjust their housing and management techniques so that de-beaking becomes unnecessary; and we so recommend.

100. Cannibalism is not a serious problem with young birds and we are confident that de-beaking is unnecessary for broilers. We recommend that de-beaking of all poultry to be kept as broilers be prohibited forthwith.

101. Another method of preventing pecking is to attach spectacles or blinkers to the heads of the birds. Although its use in this country at present is on an insignificant scale it might be extended when de-beaking is stopped. We recommend that all such attachments to the heads of the birds obscuring the vision be prohibited.

102. Breeds with large crest combs are sometimes liable to suffer damage to these, either by being pecked or through rubbing on the cage. Accordingly dubbing, or the removal of the comb, is practised occasionally. We have witnessed this operation on day-old chicks and are satisfied that at that age it is of a trivial nature and appears to cause little or no suffering, as the comb consists of only a minute ridge of anaemic skin which is removed with a scissors without bleeding. We do not object to the procedure at the day-old stage but we recommend that dubbing be not permitted in birds of more than five days of age.

CHAPTER 6

PIGS

103. Pigs have been domesticated for a considerable time, certainly since the Late Stone Age. The domestic pig has originated in all probability from the European wild pig. Turned loose in a suitable environment it will readily revert to the wild state and the habits of such feral pigs have been extensively studied and provide a reliable guide to the basic behaviour pattern of the animal. They live in family parties or small herds, preferring scrubland and light forest to open land. By contrast with herbivores such as cattle and horses, they can digest a wide range of animal and vegetable materials and will eat roots, herbage, fruit, fungi, eggs, small animals and even rabbits and lambs as opportunity offers. They are foraging animals which hunt for food and show marked curiosity in the investigation of possible sources. Much of their food is obtained by rooting in the ground for tubers, worms, insects, etc. and they are highly selective in the food they choose. Although mainly diurnal in their habits in temperate climates, pigs tend to become nocturnal during very hot weather, as they do under tropical or sub-tropical conditions. They are sensitive to temperature, disliking extremes, and adjust their behaviour to a wide range of temperatures. Although the hair is sparse the body appears to be well insulated by a thick layer of subdermal fat. They like a fairly warm environment, the baby pigs being very sensitive to cold; they are deficient in sweat-glands in the skin on which many other animals largely depend for temperature regulation. Pigs, in consequence, have the habit of wallowing in water when they get hot to provide the moisture necessary to cool the body surface. The effectiveness for cooling of the evaporation of water from the body surface, whether derived from sweat or wallowing, depends on the rate of evaporation. It is maximal in a dry atmosphere and minimal at high humidities when the rate of evaporation falls to near zero, under which conditions the pig can get less benefit from wallowing.

104. Traditionally, because of its physical characteristics, in particular its adaptability to varying circumstances and diets, the pig has been kept under a wider variety of conditions and systems of management than is possible, for instance, with sheep or cattle. It has a long tradition as a backyard animal, often kept in small, cold and some times undrained styes and fed on waste food and scraps. It is still often kept in relatively small numbers on unspecialised holdings as a useful converter of waste food. Traditionally, pigs are kept also on free range. Between these methods and the most intensive modern ones every gradation can be found.

105. According to the June 1965, Agricultural Census there are about $6\frac{3}{4}$ million pigs in Great Britain. In 1964–65 the value of pigmeat produced was about £170 millions. Pig production is second only to poultry in the degree to which it can be described as intensive but, unlike poultry, the movement towards intensification is not a recent or particularly rapid one. Specialised

pig production in this country followed developments elsewhere, notably in Denmark and the United States of America. Confinement of porkers and baconers entirely within doors became a common practice, both in houses adapted for the purpose and in specially built ones. The use of high energy compound feedingstuffs, based on grain, contributed to the development of production on a large scale. Though compound feedingstuffs are now very commonly used, there are still many pig producers who find it more profitable to employ other forms of food, such as waste from catering establishments, whey from creameries and second-grade potatoes. This type of feeding is sometimes practised on a very large scale in places where sufficient quantities of food are available locally.

106. Pigs for bacon or pork have been kept more or less permanently indoors from weaning to slaughter for many years. Most houses are divided into pens holding convenient-sized batches of pigs, the pen itself having sufficient floor area for all the pigs to lie down without lying on top of each other but without much waste space. Sometimes the pens have movable fronts which enable the area to be enlarged as the pigs grow. Such pens normally have a separate dunging area, often in the form of a narrow corridor or passage at the back or side of the pen opening into it. Sometimes this dunging passage is outside the roofed part of the building, sometimes within it. Provided the pigs use this area, it keeps the sleeping and feeding area clean and facilitates dung disposal. Often the dunging passage has a slatted floor above a collecting channel, which reduces the labour of cleaning still further. Pigs, unlike all other farm animals, can be readily induced to use this area. A high stocking density within the pen is an important factor in encouraging the use of the dunging area. This is encouraged also by the dunging passage being lighted, either artificially or through being unroofed, while the sleeping area is darkened except at feeding time. Further, the location of the piped drinking points on the walls of the dunging passage also encourages its use.

107. There is a tendency to replace the separate dunging passage by a slatted area at the back of the pen, the remainder of the floor having a slight fall to it. Totally slatted floors, though not common, are a feature of the design of some intensive pig houses. They could become more popular in the future with increased use of mechanical liquid feeding and mechanised dung disposal.

108. Reduced lighting is common, though not universal, in such houses. Sometimes the pens may be unlighted except at feeding time, or only subdued lighting provided. Frequently the dunging passage is lighted either artificially or by natural lighting.

109. Pigs in pens may be fed either from a trough, usually along the front of the pen, or from the floor. It is important with trough feeding that the length of trough, usually recommended at about one foot per pig, should be sufficient for all the pigs to be able to feed simultaneously, otherwise bullying and fighting will occur. The troughs may be filled at feeding time either by hand with liquid or solid food or, if liquid, mechanically. Floor feeding and self-feeding is often employed with dry food. It has the advantages of allowing the animals easy access to the food without the jostling and fighting that an inadequate length of trough encourages. It

also avoids the limitations on the dimensions of the pen imposed by the need to provide a trough of sufficient length for all the pigs in it. Feeding from the floor tends to occupy the animals far longer and may be more satisfactory on that account. However, the food must be spread by hand and hence it is not as economical of labour as mechanical trough feeding.

110. Pigs like warmth, and since in a warm environment less energy need be expended in maintaining their body temperature, their conversion rate is better than in the cold. The high cost of installing and maintaining artificial heating can be avoided by using the heat given off by the bodies of the pigs to maintain the temperature of the house. This method requires a building with maximum heat conservation, secured by insulation of the roof, walls and floor, reduction or elimination of windows and a fairly high stocking density. The high density involves adequate ventilation and forced ventilation is often necessary.

111. Another, and more recent, type of house for pigs is the so-called "sweat-house". It originated in Northern Ireland about ten years ago and has spread to this country. Although it is not used extensively in Great Britain there are probably about 25 to 30 true sweat-houses in operation. These houses are characterised by combining a high temperature with a high relative humidity. The system is operated over a range of temperatures but as a rule the temperature fluctuates between 75°F. and 85°F. The buildings are unheated and the temperature is maintained by the heat given off by the bodies of the animals. The high relative humidity, often exceeding 90 per cent., is attained by moisture in the breath, and evaporation of the urine. To maintain the temperature and humidity, a high stocking density is necessary, usually allowing about 5 square feet per pig to heavy hog weights, and a high level of liquid intake by the pigs. Skim milk or whey is often the basis of the ration which is commonly fortified by meal or food waste. The liquid food is fed mechanically in the larger units and the solids floor-fed. Ventilation must be carefully controlled to maintain the temperature and humidity within the narrow limits required; this is often achieved by adjusting the amount the half-door is left open according to the weather.

112. The sweat-house appears to be a relatively cheap form of construction. Its chief attraction, however, is that it is claimed to minimise the effects of respiratory diseases to which pigs are prone. These diseases become of maximum importance when large numbers of pigs that have been derived from a variety of sources, and which may carry infections, are fattened. Sweat-houses are economical of labour in that feeding and ventilation can be largely automatic and cleaning out is reduced to a minimum. Thus both capital and recurrent costs are low and it is claimed that the effects of respiratory diseases are mitigated.

113. The sweat-house system in its typical form is the most intensive method of fattening pigs in operation today. It is a method that has evoked a great deal of public comment and it has been given prominence repeatedly in the evidence which has been submitted to us. Much of this evidence has been condemnatory and the method has been criticised, not only by witnesses whose primary interest was animal welfare, but also by

several representatives of the pig industry. Accordingly we have felt bound to enquire thoroughly into the method and to examine carefully the advantages and disadvantages claimed for it. We have thought it necessary for this purpose to visit sweat-houses in Northern Ireland, where the method originated and where it is claimed to be notably successful, as well as in this country. We are grateful to the Government of Northern Ireland and to the producers we visited for enabling us to do so and for the facilities which were placed at our disposal.

114. There can be no doubt that sweat-houses are aesthetically repugnant to many people. The conditions often appear to be unpleasantly dirty; there is a strong smell and the high temperature and humidity within the buildings are obnoxious to man. This repugnance is not confined to people who take no part in pig production but is shared by many pig-farmers and others connected with the pig industry. Moreover several pig producers to whom we have talked said that, even if they wished to adopt the sweat-house system, they would be unable to do so because of the difficulty of finding men willing to work in the obnoxious conditions prevailing within the houses. Our difficulty has been to determine how far these conditions, so objectionable to man, are uncomfortable for the pig.

115. The pig has little provision for sweating and at high temperatures depends on wallowing and evaporation from the wetted body surface for keeping itself cool. In a sweat-house, because of the high relative humidity, this can provide little relief. But the pig can lose a significant amount of heat through the floor. Consequently the pigs must remain inactive if they are not to become overheated. The stocking rate is such that the whole floor is covered with pigs when they are all lying down, and they have only just enough room to do so. The floor tends to be covered with excreta, in which they must lie, and consequently their bodies are covered with dirt. There is no possibility of their keeping themselves clean, though this may not affect their welfare. When floor feeding is practised, they must find their food amongst the dirt on the floor. The respiratory rate of pigs under the hot and humid conditions of the sweat-house may rise to a high level but we have no evidence that this can be regarded as abnormal or that of itself it produces, or results from, a state of stress. The temperatures sometimes prevailing in sweat-houses are not much below those that may be lethal to the pig at high humidities, so that a small rise may result in death from heatstroke. The sweat-house requires very skilful and careful management of the temperature and humidity by adjustment of the ventilation if this danger is to be avoided.

116. Sweat-house conditions do not favour effective inspection of all the stock. The feeding may be entirely mechanical so that the house is not necessarily entered twice a day even for this purpose. The pigs are often so tightly packed that it is difficult to see the individual animal, even when they are moving about. Unless they are inspected at feeding time or when they have been roused for the purpose, ailing animals may be overlooked. We regard this as one of the more serious defects of the system.

117. We have described above the conditions of management prevailing when pigs are fattened intensively in conventional houses and in "typical" sweat-houses. We have set out as fairly as we can the advantages and

disadvantages that have come to our notice of both these types of management. There are, however, many variants of both types and a range of intermediates between them, mainly in adapted houses, that renders clear definition impossible. There is no clear distinction by which the one system can be distinguished from the other in all cases, though typical examples of either are distinctive. We are unable therefore to suggest standards which should apply specifically to each system and our recommendations will apply to all forms of intensive management of pigs intended for slaughter. We are satisfied that the conventional system can, where necessary, be readily adapted to these requirements but we are uncertain whether the sweat-house system can be so adapted. We believe that if it can, then its more objectionable features will have been abolished and we would not wish to inhibit the evolution of a system on these lines that has at least some advantages but we do not consider that the sweat-house system in its extreme form, as practised at present, is satisfactory.

118. A primary concern is the amount of living space available to the animal. This has tended to decline to a level at or near that at which the saving in capital costs of the buildings becomes offset by loss in production and is clearly well below that which is acceptable. We are of opinion that basic mandatory standards should be set in the general interest of the welfare of pigs and we recommend accordingly that the minimum floor space allowed per pig, between 150–210 lb. liveweight, should be 8 square feet clear including the dunging area, and above 210 lb. liveweight it should be 10 square feet clear including the dunging area.

119. We have considered the question of houses not having a separate dunging area, walled-off from the sleeping and feeding area. This arrangement is not necessarily confined to highly intensive houses but it is certainly more common with them. In general a slatted area is provided in such pens, although it is not partitioned off. Some producers claim that they are able to ensure that the pigs use this area but our experience does not sustain this claim. Our observations lead us to believe that where the dunging area is not walled-off the sleeping and floor feeding area becomes soiled. This is undesirable in our view both for reasons of hygiene and for the comfort of the pigs, especially when the temperature of the house is low. We consider that in fattening houses where litter is not used a separate dunging area of not less than $1\frac{1}{2}$ square feet per pig should be freely available to every animal. It is desirable that the dunging area should be separated from the feeding and sleeping area by a partition not less than 2 feet 6 inches high. We recognise that this cannot be made mandatory since to do so might well be contrary to the welfare of pigs kept under certain systems, e.g. skim milk fed.

120. Totally slatted floors are uncommon in pig houses but might, as we have stated in paragraph 107, become more popular. We are not attracted by the possibility of this development but the information available to us at present is insufficient to justify recommending their prohibition. More information is required on their effects on the comfort of the animals when sleeping ; on the confidence with which animals walk, and the ease with which they can lie down and get up ; and on whether leg and foot ailments are more common than on solid floors. Totally slatted floors should be prohibited if they prove to be unsatisfactory in these respects even if they

result in economy of labour. This is a matter which should be referred to the Farm Animal Welfare Standing Advisory Committee (Chapter 11).

121. The atmospheric environment is particularly important for the comfort of pigs, as we have said, and they should be free from draughts. The levels of temperature, relative humidity and ventilation that are suitable are fairly well established and are recognised by many enlightened producers and by the advisory services; but they vary with the age of the animal. We are unable to recommend that they be made mandatory because of the difficulty or impossibility of enforcing such requirements. We believe it to be worthwhile, nevertheless, to suggest certain standards which should be recognised as basic to good husbandry and which we hope would be generally adopted. The temperature for fattening pigs up to 120 lb. liveweight should be in the range 65°F. to 75°F., for bacon weight (190 lb. liveweight) it should be 60°F. to 70°F. and up to heavy hog weight (250 lb. liveweight) 55°F. to 65°F. The relative humidity should be in general below 80 per cent. The ventilation should be designed to secure the conditions stated above.

122. The use of severely restricted lighting is becoming increasingly common with intensive pig husbandry and it is especially associated with the use of purpose-built windowless houses. It has relevance to welfare in two ways. First, its use with pigs causes us less anxiety than with some other creatures so far as its direct effect on their comfort is concerned. The pig in the wild state is a partially nocturnal creature; near darkness does not diminish its activities and it will sleep in the day-time, preferring a shady or dimly lighted spot to do so. We do not believe, therefore, that there is a need to specify the intensity or duration of illumination but we consider that the pigs should have access to light, which need not be daylight, for several hours per day. Secondly, the provision of adequate lighting for inspection of the pigs by the stockman is highly important. Efficient routine inspection of every individual animal at least once per day, and preferably twice, we consider essential. We recommend accordingly that the provision of lighting in the building bright enough to enable all the animals to be seen clearly should be mandatory.

123. The use of floor feeding, as against trough feeding, is a feature of intensive methods of pig husbandry to which we have referred in paragraph 109. It appears to us to have some advantages over trough feeding so far as the welfare of the pigs is concerned provided the floor is kept clean. This should not present difficulty when the housing includes proper dunging facilities as specified in paragraph 119, and it is in the interests of the producer to ensure good hygiene in this respect.

124. The incidence of tail biting appears to be more frequent amongst pigs that are kept intensively, although it is not confined to them. It can be prevented by docking the tail, but this may merely divert the attack to the ears or snout. Docking is becoming increasingly common with the spread of intensive methods. It is practised as a matter of routine on all pigs intended for fattening in some premises, but in others it is resorted to only when vice occurs in a particular batch. We believe that the vice of tail biting is rare under good management in suitable houses that are

not over-stocked, and that in consequence docking will be generally unnecessary under the conditions we have specified. We disapprove of this mutilation in principle; it involves the destruction of sensitive tissue and bone, thus causing severe pain and we recommend that the docking of pigs should be prohibited, save when necessary as a remedial treatment by a veterinary surgeon.

125. Intensive methods are coming into use for keeping breeding sows as well as for fattening pigs. A recently introduced practice is the keeping of pregnant sows in cubicles in which they cannot turn round, the cubicle being either open at the rear end and the sow tethered, or closed with the sow's head free. This practice prevents bullying, as adult sows are more vicious in establishing a social order than are young fattening animals. It also simplifies management and allows control of the individual food intake. Despite those advantages we are unable to approve such close confinement continuously throughout pregnancy. The farrowing sow is often still more closely confined in the interests of the piglets but to this we do not object as it is only during the period of parturition and the succeeding few days. After weaning the breeding sow has at best only a few days of comparative freedom before the next service and repetition of the regime. She may spend, therefore, the greater part of her breeding life in very close confinement. We recommend that pregnant sows should not be kept without daily exercise in quarters which do not permit them to turn round freely and in any event they should not be tethered indoors.

126. For the pig, as for other domestic animals, we regard the reduction of disease as a very important, perhaps the most important factor in promoting their welfare. Lameness in fattening pigs is a common ailment at the present time, but we have been unable to discover that it is associated with any particular form of management. With research into its causes being much intensified latterly, it is hoped that its causation will soon be clarified. Our attention has also been drawn to the recent development of the production of minimal disease pigs. Reports suggest that the health and performance of herds founded on such stock is superior, provided that very high standards of husbandry are maintained and the herd is isolated from infection by other pigs. It would be premature to judge how widely such methods can be applied with success on a large-scale to commercial pig production but in so far as they may contribute to the reduction of disease, particularly enzootic pneumonia, we would welcome them.

CHAPTER 7

CATTLE

127. Cattle have been domesticated for over 6,000 years. The European breeds are thought to have been derived from the wild aurochs. Whatever their precise origin, modern cattle come from ancestors that were essentially herd living and grazing animals, that spent most of their time grazing or chewing-the-cud while standing, or lying down with their legs doubled under them. The calves ran almost from birth by the mother's side, maternal care for the young being pronounced. Herd behaviour was highly developed, the bull being polygamous. Threatened with danger, the animals tended to congregate in a close group, with the calves in the centre and the adults facing out for defence. Cattle were accustomed to roaming over wide stretches of country in search of grazing or water and had no fixed territory. They displayed marked curiosity when their attention was attracted to anything strange in their environment. Domestic cattle have retained all this basic behaviour to a marked degree and are intelligent animals.

128. Domestic cattle will breed at all times of the year. The non-pregnant cow will mate at intervals of three weeks. Pregnancy lasts about 280 days. Single births are the rule, but twins occur. Artificial insemination is widely practised in this country, particularly among the dairy herd, where it now accounts for 70 per cent. of all births.

129. There are nearly 11 million cattle on farms in Great Britain. The total annual output of the dairy industry in Great Britain is valued at approximately £380 millions and the value of meat produced from cattle, including beef and veal, is about £250 millions. Thus, in terms of value of product, cattle are much the largest item in the livestock industry of this country.

130. The management of cattle can be considered under four headings: bulls for breeding; dairying; calf rearing; and stock-raising for beef. Of these, the first is not intensive within our definition and we have not considered it. After careful thought, we have decided not to include the keeping of dairy cattle in our enquiry for several reasons. The husbandry of dairy cows does not seem to have evoked any considerable public anxiety and has received very little mention in the evidence presented to us. Dairy cattle are subject to inspection and a variety of regulations in relation to health precautions. Although they are frequently kept entirely within doors at fairly high stocking densities, and their management is often highly mechanised, the development of these methods has been gradual. Our impression is that no other kind of farm livestock is so well cared for. Moreover, a thorough inquiry into the methods of dairy husbandry in use throughout the United Kingdom would have greatly lengthened our deliberations. In our opinion the results would not have justified the delay in completing the other, and more important, part of our work. Nevertheless,

we anticipate that the general principles governing animal welfare which we are enunciating and some of our more specific recommendations relating to housing and flooring for beef animals will be applicable to dairy cows.

131. One matter that affects both dairying and calf-rearing we must mention. Separating the calf from its mother shortly after birth undoubtedly inflicts anguish on both. Maternal care for the young is highly developed in cattle, and it is only necessary to observe the behaviour of the cow and of the calf when they are separated to appreciate this. It is a consequence of keeping cows to produce milk for human consumption and we regret that we know of no way by which it can be avoided.

132. Nearly all calf-rearing is intensive in a sense, irrespective of the use to which the calves are finally put, since most of them are taken from their dams at an early age and reared independently. Hence they require a great deal of attention, particularly as regards housing, environment and diet. Calves, in common with the young of other species, are highly susceptible to disease, a susceptibility greatly aggravated by two circumstances. Calves born to dairy cows are taken from their dams at a very early age, sometimes without having received the first milk or colostrum on which their powers of resistance to infection mainly depend. Maternal immunity is normally transmitted to the calf by this means during the first day or two of independent life. Such calves are, therefore, particularly liable to infection. Secondly, unless the calves are required for replacement on the farm, they are likely to be exposed to the hazards and hardships of transport and marketing and the greatly increased risk of infection thereby involved. Isolation in separate pens is almost essential at first to avoid the spread of infection and to facilitate treatment of those already infected. Initial feeds of glucose and water and large doses of vitamins and antibiotics are given to compensate for deficiencies in colostrum and to tide them over this difficult period. Consequently, calves are normally kept indoors; their food has to be brought to them and they are confined, often in individual pens.

133. The necessity for confinement may apply irrespective of whether they are intended for veal, for beef or for dairy replacements, but the type of housing and form and degree of restraint varies greatly. Calves fed on whole milk, particularly those that suckle their dam and which have access to fodder, need less cosseting than others and can be reared successfully and without suffering, under fairly rudimentary conditions. Pail-fed calves on the other hand, and particularly those fed on milk substitute diets, require a much better environment and housing. Calves separated from their dams lick and suck each other. This undesirable habit and the liability to spread infection are the reasons for restraint. For their first few weeks the use of small pens or crates, holding one or more calves, is usual in all types of calf rearing.

134. Calves of some dairy breeds are seldom used for fattening and, if not required for dairy replacements, are killed during the first few days, the "bobby" veal produced being used mainly for manufacturing. In practice it is often difficult to distinguish between calves that are reared for slaughter as ordinary veal, those that are kept for beef and those that are for dairy replacements; on many farms they may share the same quarters

and a decision as to their ultimate use may not be taken until they are some weeks old. There is, however, no difficulty in identifying those intended for the "white" veal industry, since the method of management for this is highly specialised and characteristic. It involves the most intensive methods of calf rearing and it is that to which most attention has been paid in the evidence we have received. It is clearly the most important type of calf rearing in so far as our terms of reference are concerned and to which we have devoted most of our attention. It is this type which we will consider in the succeeding sections but the recommendations we shall make, with the "white" veal industry primarily in mind, will be applicable to all forms of calf rearing in so far as they are intensive.

Veal Calves

135. Calf rearing for the quality "white" veal production is possibly the most specialised and uniform of all forms of intensive animal husbandry. There is remarkably little variation in the methods followed and in the conditions of housing from one unit to another. This presumably is because producers, with the encouragement of those feedingstuffs manufacturers who produce the specialised milk substitute foods used, have copied closely the methods used in Holland, where the method originated. Like other forms of intensive husbandry, it can be completely independent of the other operations of a farm, and need not be associated with one. The prerequisites of "white" veal production are buildings and a supply of suitable calves at economic prices.

136. The total annual production of veal of all kinds in Great Britain is relatively small. In 1964–65 it amounted to about 11,000 tons (compared with 824,000 tons of beef, 719,000 tons of pigmeat and 247,000 tons of mutton and lamb) and much of it is bought by catering establishments. It is difficult to foresee with any certainty the future scale of "white" veal production but many people believe that this type of meat is likely to become increasingly acceptable to the public and that, as this occurs, there could be a rapid increase of production. In this context it is important to bear in mind the ease with which producers can go into production. The chief limiting factor to the size of the industry appears to be the supply of calves. Under present economic circumstances, producers who intend rearing calves for beef can afford to pay higher prices for them than veal producers, and it seems likely that the price of beef will continue to limit the availability of calves for veal.

137. The most distinctive and important feature of "white" veal is, of course, the colour and texture of the flesh. It is this that gives it its appeal and price premium; consequently the producer aims at as white a flesh as possible. Traditionally, veal calves were kept on whole cow's milk and received similar treatment to dairy replacements. They were not given roughage, however, and were sometimes kept in darkness with periodic bleeding in the belief that this contributed to a whiter flesh. The feeding of whole milk is no longer profitable. The present-day "white" veal industry is based on the use of proprietary milk substitute diets of a type developed in Holland several years ago. These feedingstuffs consist mainly of skim-milk solids with the addition of vegetable fats. The fat content

is high—usually above 18 per cent. nowadays, several times that of cow's milk of which the national average butterfat content is around 3·7 per cent. With the use of these high energy feeds the producer is able to take advantage of the rapid weight gain and good conversion which can be obtained over the first few weeks of the calf's life. "White" veal calves often gain up to 2½ lb. per day. The calves are kept normally for about 12 weeks, during which time they grow from a weight of about 90 lb. to around 250–300 lb.

138. The degree of restaint imposed on calves for "white" veal production tends to be closer than for other forms of calf rearing. The calves are kept under the same conditions for the whole of their 12 weeks of life. The most common form of housing consists of wooden crates measuring 5 feet by 2 feet with slatted floors raised 9 inches or so above the ground, through which the dung can fall to the floor. After a period of about three weeks, depending on the breed of the calf, it is unable to turn round in its crate. Sometimes the sides of the crates are solid so that the calf cannot normally see or touch its fellows; the sides, as well as the front, may be barred. Again, the pens may be open-ended and the calves tied by a short tether. Occasionally calves are kept in multiple pens and are then tethered. Most producers pay close attention to maintaining a comfortable minimum atmospheric temperature, usually about 65°F. with a relative humidity of above 70 per cent. During the day the lighting is usually subdued, but calves are rarely, if ever, kept nowadays in total darkness as it is recognised that light does not affect the colour of the flesh. Subdued lighting minimises the fly nuisance.

139. The aspects of white veal production which mostly concern us, and which were given most emphasis in the evidence we received, relate to the diet and to the severe restriction of movement imposed on the animals; but there are other matters which call for comment.

140. The diet of the "white" veal calf raises greater problems than those concerning any other animal. This is because the diet is regulated with the intention of preventing the flesh of the calf developing the normal red colour of lean meat. The intake of iron is kept to the minimum necessary for survival in the comparatively inactive state in which the calf is maintained. The food intake is confined to a liquid diet having a predetermined and accurately known iron content. The calf is not allowed access to fodder, from which much of the normal intake of iron is derived. Precautions are usually taken to prevent the animal assimilating iron in other ways, for instance through licking iron fittings in its pen, even though it is doubtful if it could absorb iron in this way. The problem which we face is whether the physiological state of the calf resulting from this controlled diet is likely to cause suffering.

141. The red colour of lean meat is due to the presence in the muscle of the red pigment myoglobin, a substance closely allied to the haemoglobin of the blood and, like it, containing iron as an essential component. If the lean meat of an animal is abnormally white it is because its content of myoglobin is abnormally low. Axiomatically, "white" veal is deficient in myoglobin, and this cannot be gainsaid. It is, however, possible to argue that the deficiency is not such as to cause suffering.

142. No animal totally deficient in iron could survive, for the haemoglobin of the blood and certain colourless enzymes containing iron in the cells are essential for life. The normal and most convenient way of measuring iron deficiency in an animal is to determine the haemoglobin level of the blood. If it is abnormally low the animal is said to be anaemic. Some limited information is available on blood haemoglobin levels in calves. The most striking feature of these is the wide natural variation in the haemoglobin level at birth which may persist for the first three months. In this connection we should refer to the troubles which have sometimes been caused by the use in this country of a formula for the milk substitute diet evolved for conditions in Holland where the iron content of the water supply (with which the milk powder is mixed) is generally much higher than in many parts of Great Britain. This difference has now been recognised by the principal feed manufacturers and sufficient iron has been added to the diets to compensate for the difference in the water. In this way the early troubles with acute anaemia appear to have been eliminated. It may be true that contemporary milk substitute diets contain more iron than does whole milk but this fails to allow for the ability of the calf suckling its dam to obtain iron from other sources.

143. It has been represented to us in evidence that because the haemoglobin values of "white" veal calves fall within the limits of variation of the levels in new born calves (though little above the lower limits) they cannot be said to be anaemic. It is clear that calves commonly display a decline in haemoglobin levels in the early part of their lives and that those kept for "white" veal at the time of slaughter generally have lower haemoglobin levels than the normal for dairy calves. It is argued that this fall is not objectionable because normal calves at this period of life take up more iron than they require at the time in order to store it for a later period and that the veal calf gets enough for its need up to the time of slaughter. We have given these considerations in relation to anaemia at some length because the subject has figured prominently in the evidence we have received and in public discussion. They are of interest in relation to the general physiological state of the iron deficient calf. They do not affect our opinion that because quality veal is by definition abnormally white it is, therefore, abnormally deficient in myoglobin and we consider that this deficiency is due to regime, perhaps to the iron deficiency in the diet, though the state of inactivity in which the animal is maintained is more likely to contribute to the failure to produce a normal amount of myoglobin.

144. The withholding of roughage from "white" veal calves, because they might drink less milk substitute and because roughage might affect the colour of the flesh has other consequences. A normal calf, raised with its dam, begins to nibble grass or other roughage at an early age, probably when it is not much more than a fortnight old. This roughage in the alimentary track enables it to begin rumination long before it is weaned and certainly much before it is twelve weeks of age. Early weaned calves, offered concentrates and roughage from an early age, commonly ruminate from three weeks onwards and rumination may start even earlier in some cases. The veal calf, deprived of fodder and fed exclusively on a liquid diet, cannot ruminate because it has no roughage. It is claimed

that it has no need to ruminate because the diet does not require it. Cattle have highly specialised digestive systems, a characteristic function of which is rumination. Grazing or the eating of some roughage is followed by a period of rumination. We find it hard to believe that the urge to ruminate is not part of the satisfaction of feeding. It is true that suckling seems to suppress the urge to ruminate, but even the suckling calf will ruminate when it has nibbled fodder, though it does not do so to the extent of a calf removed from its mother and given solid food. The " white " veal calf has not the satisfaction either of suckling or of rumination. Its habit of nibbling the woodwork of its pen and anything else it can reach suggests a desire for solid food. Moreover the absence of solid food in the digestive tract commonly results in the hair derived from licking itself accumulating as hairballs in the rumen which remain at slaughter.

145. We are convinced that the methods of rearing calves in the " white " veal industry do not conform with the principles of welfare which we have set out in Chapter 4, paragraph 39, in that they result in abnormally white muscles and postpone the development of rumination. The diet should be such as to ensure normal levels of haemoglobin and to permit of rumination. We therefore recommend that milk substitute or other manufactured diets should be so reinforced with iron in a suitable form as to ensure that on a normal intake the animal is in no wise deficient in this element. We recommend that all calves be provided with palatable roughage daily at all ages from a week after birth. It need scarcely be added that the old practice, now discarded, of periodically bleeding calves to produce an anaemia is unacceptable ; and to prevent its revival it should be made illegal.

146. Veal calves on a milk substitute diet are not normally given drinking water ; and this has been criticised as a privation. These animals normally consume several gallons of water each day in the form of milk substitute, so that their intake of water is more than ample for their needs and there is no evidence to suggest that they are thirsty.

147. We now turn our attention to the amount of restraint which is proper in our opinion. Calves taken from their dams at birth or soon after clearly must be housed for their own good. Where these have been gathered from a variety of sources, have been transported, often for long distances, and may have been exposed at market, good hygiene demands that they should be kept separately until it is believed that they are clear of infection. Fairly close confinement during their first few weeks is called for in consequence and is clearly to their advantage. There is reason to believe that if the calf of any age cannot turn round, so that its feeding place does not become soiled with droppings, and if it cannot lick its neighbours, the risk of enteric infections is significantly reduced. Close restraint and separation from its fellows also prevents navel-sucking and bullying. Another factor to be taken into account is that cattle of all ages kept indoors become very accustomed to their immediate environment and routine and that a change, even to another house, unsettles them and tends to set up a temporary state of stress which is reflected for a week or two by decreased growth rate. Nevertheless calves at large are normally active, playful animals. They lick and groom themselves, show curiosity about their environment and are

sociable. Under unrestrained circumstances they display few of the objectionable habits associated with close confinement.

148. To determine the degree of confinement which we consider acceptable for rearing calves we have attempted to apply the principles outlined in paragraphs 36, 37 and 38 of Chapter 4 in the light of the special considerations mentioned in the last paragraph. We have given this matter very careful consideration and we recommend that the yoking or close tethering of calves, except for short periods and for specific purposes (e.g. feeding or veterinary treatment) should be prohibited.

149. Provided it is not too small, the individual pen or crate allows some freedom of movement and is tolerable. Unless under specific veterinary advice for individual sick animals, we consider that calves should have sufficient room to be able at all ages to turn around, to groom themselves and to move without discomfort. The size of pen in common use at present for " white " veal production is, we believe, too small to meet these requirements adequately, especially as the calf approaches slaughter size.

150. We have considered carefully the representations that have been made to us in favour of the small pen and we are unable to accept that those advantages which cannot be secured in other ways are sufficient to justify so close a measure of restraint. We recommend that individual pens for calves should be of a sufficient size to allow the calf freedom of movement, including ability to turn round and that those for calves of 200–300 lb. liveweight should measure at least 5 feet by 3 feet 6 inches. Pens for accommodating more than one calf of this weight should allow not less than 12 square feet per animal. We recommend that the sides should not be solid above 2 feet from the floor, so that calves can see their neighbours when standing. Solid sides below 2 feet from the floor may be an advantage to the calf as an additional protection against draughts when lying.

151. Calves for " white" veal production are normally kept on slatted floors without bedding. The slats most commonly used are wooden ones $1\frac{1}{2}$ inches wide with a 1 inch gap. We consider from what we have seen and heard that the calf can stand and move with reasonable care and confidence on these, provided they are not badly worn or slippery. It is most important that slats should be well designed and constructed and that they should be properly maintained. At present the evidence is insufficient to form a judgement as to the welfare of calves on types of open-work floors other than slats, e.g. metal mesh. Further attention should be given to these if they come into more general use.

152. We do not, however, feel that calves should be kept permanently without bedding, irrespective of the form of floor. All bedding is withheld normally from calves for " white " veal because they would obtain roughage therefrom and because it is easier to keep the floor clean without. We have recommended that all calves should be given roughage and when this is done there will be no reason to withhold bedding because it would provide roughage. We therefore recommend that calves should be provided with sufficient clean straw or other bedding on which to lie down.

153. Atmospheric conditions are most important for calves. They require plenty of fresh air but must not be exposed to draughts. Although calves

do well at temperatures as low as 50°F. we consider that they are better at temperatures of 55°F.–60°F. and at relative humidities of not more than 75 per cent. We hope that these standards will be generally accepted and acknowledged by the advisory bodies.

154. As stated earlier, calves are seldom now kept in darkness. Calves can suffer from strong direct sunlight. There is no evidence that lack of direct sunlight causes them any harm. Reduced lighting has the advantage of discouraging flies, which can be an even more serious nuisance to an animal in confinement than at large. We consider that the lighting during the day should not be reduced below the level at which the calves can be clearly seen and can, presumably, see each other.

155. We wish to stress the paramount importance of good stockmanship in the rearing of calves, especially by intensive methods. Each calf should be adequately inspected, at least at feeding time and the lighting should be sufficient for this purpose. Finally we would express the hope that the responsible bodies will continue to press for improvement in the conditions of transport and marketing of calves.

Intensive Beef Production

156. Barley beef, which is the most intensive form, had its origin, so far as this country is concerned, in the work at the Rowett Research Institute in the late 1950s and early 60s. This showed that suitable calves fed on a diet consisting of crushed whole barley fortified with protein, vitamins and minerals with no additional fodder could be brought to slaughter weight at about 11 months of age instead of the usual minimum of 18 months required with store animals fattened by conventional methods. The system depends on two factors ; ample supplies of cheap barley and a supply of suitable, reasonably priced calves.

157. Although intensive beef production involves the confinement of the animals in covered yards or houses, a variety of forms of housing can be used. Farmers in many cases find it cheaper and easier to adapt existing buildings for the purpose. Many purpose-built installations are also in use ; their design varies widely with the materials most readily available and the method of disposal of the manure. The capital cost of buildings therefore varies greatly and the annual allowance for depreciation may range from about £2 10s. to £6 per animal. The high-cost, purpose-built installation usually has slatted floors so that the manure may be collected below and pumped away in fluid form for disposal on the land. It is customary for such buildings to be stocked at a fairly high density, so as to make the most of the capital spent and to ensure that the traffic of animals is sufficient to keep the floor clean by moving the dung through the slats. High density stocking in an enclosed building frequently requires mechanical ventilation, normally provided by fans in the roof ridges or gable ends driving out the exhaust air and with louvred inlets or open windows for air entry in the sides of the building. There are many variations on this basic pattern and also on the way in which the enterprise is fitted into the husbandry programme of the farm. The animals spend virtually the whole of their lives within the building in what might be termed the truly intensive units ; in others the producer may combine the use of some pasture with indoor housing. The

animals are often kept on deep litter of straw within covered yards in the less specialised and cheaper installations. These may be completely enclosed or partially open to the weather; either seems to be successful if other aspects of management are satisfactory. There is no great measure of agreement amongst producers as to the importance of the degree of protection from the weather but it is widely acknowledged that adequate ventilation, either forced or natural, is essential.

158. Intensive beef has several obvious attractions to British producers and one or two drawbacks. First, it provides an outlet for the barley crop. Secondly, compared with traditional methods, it offers a quicker return on the capital tied up in the animals. Largely for these reasons intensive beef production has increased rapidly in Great Britain over the last few years. The Ministry of Agriculture recently instituted an inquiry in the annual agricultural census concerning the intentions of beef producers, from which it appears that about 15 per cent. of the animals being fattened for beef at present are intended for early slaughter under an intensive form of production. There is no accurate information as to the manner of housing these animals but it is probable that the majority are kept loose-housed in covered yards on straw bedding. It is probable that only a small proportion are kept in purpose-built intensive houses. The size of the units varies markedly. One which we visited held several thousand animals in groups of 10 in yards on straw bedding, with protection from the weather provided by partial walling and roofing. At the other end of the scale there are many small units each with only a handful of animals. Probably most of these are only semi-intensive in that they may depend to some degree on the use of pasture.

159. The evidence we have heard concerning intensive beef systems has centred on two aspects; the effects of the high energy diets and the forms of housing employed. We shall consider these two aspects in that order. We have already covered, earlier in this chapter, the minimum conditions which we recommend should be observed in the early rearing of calves, whether for veal, beef or dairy replacement. Our comments and recommendations in the succeeding paragraphs therefore relate to the stage after calves intended for beef have been taken off a mainly milk or milk substitute diet.

160. Some beef animals when slaughtered are found to have liver disorders. Many witnesses have told us of the occurrence of these disorders in intensively-kept, barley-fed animals. We have been unable to discover any evidence to indicate a causal relationship and there are most certainly other and complex factors involved. The incidence of liver troubles varies greatly from one area to another, and in some appears to be as high in grazing animals as it is in those fed on a barley diet. It is possible that the addition of some roughage to the barley diet may tend to reduce the incidence of liver complaints, but we have not been able to establish that this is so. However, the provision of roughage in addition to the barley diet is believed to reduce the incidence of bloat and other digestive disorders that are responsible for many of the losses which occur amongst barley-fed animals. Although a diet based on crushed or crimped whole barley is said to contain sufficient roughage for the animals to ruminate,

the addition of hay or straw provides for the better performance of this function. Although some producers can raise their beef successfully on the barley diet without encountering digestive troubles, the majority do provide some additional roughage. Very many producers bed the animals on straw and some use straw bales as walls to the yards for protection against the weather and, inevitably, the animals eat some of this straw. The provision of roughage may diminish slightly the rate of liveweight gain but we do not think that this effect is material when weighed against the advantages. We advocate that, for barley-fed animals, roughage in some form should be provided and that this should be stressed by the advisory services and others who give guidance to producers.

161. We must pay attention to the form and degree of restraint which may be used with beef animals. With the average type of beef housing we do not consider that there is a problem so long as producers do not attempt (and we do not believe the majority do) to exceed the commonly accepted levels of stocking density. But there are certain instances where very close and prolonged restraint is enforced. It is the practice under some systems of husbandry to hold beef animals tethered or yoked in pens or in courts. This is rarely a feature of what are regarded as modern intensive beef systems but it is, for instance, traditional in the North of England and in Scotland, mainly, but not exclusively, for in-wintering.

162. We dislike all such forms of close restraint for several reasons. In the first place they run counter to the animal's recognised behavioural pattern with its emphasis on social structure, movement and curiosity of the animal about its surroundings. The animal is prevented from exercising itself and in some cases is unable to groom itself adequately. The advantages of prolonged tethering, both to the animal and to the producer, seem to us small and we believe this practice could be superseded. We therefore recommend that restraint by prolonged or permanent short tethering or yoking of animals being fattened for beef production should be prohibited forthwith. We also recommend that all forms of prolonged tethering should be prohibited as soon as practicable. By " short " tethering we mean tethering which prevents the animal from grooming itself properly. By the use of the word " prolonged " we mean to include any system of husbandry that involves the animal spending most of its time during some months of the year under this form of restraint. We accept that there are many valid uses of brief tethering and occasions when it is unavoidable. Our recommendation consequently excludes the use of tethering or yoking for limited periods of feeding or as a means of isolating a sick animal for veterinary treatment.

163. In addition to these forms of individual restraint we have considered the significance of the limitations which confinement in pens or yards—sometimes at high stocking densities—may have for the animal's welfare. Our opinion, based on the evidence before us and our own observations, is that in the majority of forms under which intensive beef is produced, conditions in this respect are already satisfactory. Problems are more likely to arise where specialised accommodation is used and where the economic pressure on the producer is to put as many animals as possible into the house to reduce the capital charge per animal. The normal practice is for them to be segregated in small groups of a few animals which often

remain together for the whole of their lives. Sometimes the groups may be quite large, fifty or more animals in large yards, but this is not typical of the highly intensive indoor system.

164. We consider space per animal to be most important to their welfare but judgment is complicated by the variation in housing conditions. It is difficult in practice to be certain whether crowded or uncomfortable conditions are producing stress in cattle. But in view of what is known of the animal's normal pattern of behaviour, we believe it is right to assume that overcrowding can lead to stress. The point at which such stress is liable to occur is impossible to determine with any accuracy, especially as other features of housing, such as the surface on which the animal treads and the efficiency of the ventilation, may be contributing. We consider that there is, nevertheless, a need to establish minimum standards of floor space per animal for housed beef cattle and that the commonly accepted levels of 17–25 square feet are not always adequate, depending on the type of floor used. We recommend that a minimum of 25 square feet for beasts of more than 500 lbs. liveweight should be imposed and that this should apply to all forms of flooring.

165. Slatted floors are a feature of intensive housing to which we have paid close attention in our own farm visits and in taking evidence and we have studied, inter alia, the recent Agricultural Research Council publication " Slatted Floors ". We do not think it possible to consider slatted floors in isolation without also looking at the use of solid concrete floors which are commonly provided for in-wintered animals. We note that this subject has significance outside the field of intensive management.

166. The successful use of slatted floors as a simple means of preventing dung from accumulating in the animals' living quarters depends primarily on achieving a satisfactory balance between the nervousness of the animals in standing and moving on the surface (which tends to be increased as the proportion of gap to slat increases) and the need to ensure that the gaps are wide enough for the dung to pass through. There is no doubt that cattle are less confident on slatted floors than on solid ones, particularly when the slats are slippery, even though the effect may be mitigated by running the slats parallel to the feed troughs so that from the animals' viewpoint the surface looks less broken.

167. Consideration of flooring must extend to the ease and safety with which the animal lies down and gets to its feet, as it is at this time that the strain upon the hooves is likely to be greatest and that there is most risk of bruising or other damage to the limbs and joints. The weight of the animal is clearly of foremost importance. Young cattle appear more comfortable on slats than mature animals and we consider this to be in large part a reflection of the weight differential. Short intermittent periods on slatted floors may have no effect whereas prolonged sojourns on them may set up strain or stress. The permanent keeping of dairy cows on totally slatted areas has not met with general success. The animals demonstrate their discomfort by a reduction in the yield of milk. Yet when slats are combined with some other form of flooring to give a variety of surface the cows will use the slats for considerable periods of the day without apparent discomfort.

168. We believe that in addition to the firmness of the surface and the way in which it bears upon the hoof of the animal, it is necessary to take account of the degree of confidence which the animal may feel in moving. Most of the slatted floors that we have seen have been slippery. This tendency is accentuated with the less efficient designs where the dung does not clear quickly and the defect is likely to be worsened by high humidity through bad ventilation in some densely stocked buildings. The immediate consequence for the animals is that when they try to move quickly, or when rising or lying down, they may slip and damage themselves. The immediate injury may only be slight but repetition of efforts to recover their footing can cause strain to the limbs and joints and set up a state of anxiety. We have observed swollen joints amongst cattle kept wholly on slats, which we attribute to this cause. We have also noticed animals lying with outstretched legs and we consider this unusual position is adopted because of the discomfort of lying with sore joints in the normal position on a hard floor. The animals may become nervous of moving and this may become more pronounced with time.

169. In view of all these considerations, we cannot accept the use of totally slatted floors as a permanent form of housing for beef animals. We consider that slats have a useful function as a means of ensuring the effective disposal of dung, and this is in the interests of the animal as much as the producer, but we believe that where animals are permanently housed indoors an alternative form of flooring should be available to them. We recommend that not more than half of the intensively housed animal's living space should be slatted and that the non-slatted part should include provision of bedding. We do not consider that a solid, unyielding floor would be acceptable as an alternative and we recommend that bedding should be provided for animals which are kept in houses or yards.

170. There are other points concerning slatted floors to which we think attention should be given. Their suitability seems to us to depend very much on small details of design and management and it is important that they should be properly maintained. The surface should be such that the animals do not slip and cannot damage their hooves. Attention to these details makes a substantial difference to the comfort and thrift of the animals.

171. Cattle are contented and productive within a wide range of temperatures; but extreme fluctuations should be avoided. Adequate ventilation is essential with housed cattle, as with other livestock. Our enquiries lead us to believe that it is normally satisfactory. The greatest likelihood of trouble occurs with highly stocked specialist houses, rather than with covered yards, but we consider that producers and the advisory services are fully alive to the importance of ventilation and that no further action is called for at present.

172. Because of their greater size and individual value and because generally they are not housed in such large numbers, cattle cause us less concern as regards routine management inspection than other forms of livestock. Nevertheless, we must stress that this is a most important aspect of their welfare and it is possible to envisage circumstances with large units and mechanical feeding where standards could fall below the desirable

level. As with all farm animals, we consider that such beasts should be inspected at least once daily by a stockman with sufficient knowledge to recognise signs of discomfort or disease. In this respect it is important that sufficient lighting should be available. At present there is little or no incentive to producers to control the light that is available to the animals; but some specialist houses, lit only by diffused daylight, are in use and with regard to these we hope that the desirability of providing the animals with sufficient light and the importance of there being adequate light for efficient inspection will always be recognised.

CHAPTER 8

SHEEP

173. Sheep production in one form or another is common to all parts of Britain. Traditionally sheep flocks have been maintained on mountain grazings, upland pastures and on lowland arable and grass lands. Sheep have been kept as outdoor animals, protected by a full fleece in winter and shorn annually at the first signs of warm weather in early summer. Breeds have been evolved to suit the widely different environments of Britain, for example, the Scotch Blackface, the Swaledale and the Welsh Mountain for the mountain and hill areas and the Down breeds for the more productive farming districts. The mountain flocks made economic use of land which would otherwise contribute little to food production. They also form the foundation stock for the production of crosses known as " half-breds ", which are used as dams on lowland farms for the production of fat lambs sired by Down rams. The sheep breeding industry is therefore loosely integrated, lowland farms and upland farms being dependent on one another. Most flocks lamb once a year in spring, mating taking place as the days shorten in late summer. The gestation period is approximately five months.

174. In recent years stocking rates of ewes and lambs have been intensified, especially on very productive grassland where it is now quite common to graze ten ewes and fifteen lambs an acre during the summer. Modern intensive grazing methods have made this possible. It was soon realized, however, that the heavy stocking of grassland in winter caused much damage to pastures, particularly on clay soils, seriously reducing the early spring growth of grass. Attempts were, therefore, made to relieve the pastures of stock during the winter, housing of flocks being one of the methods adopted. The practice is by no means widespread but experimental work has shown that it is a practicable alternative to conventional outdoor wintering. The breeding ewes, which are in the mid-pregnancy stage, are normally housed in late December and remain indoors until after lambing in March and April.

175. Sheep housing takes varying forms, from existing farm buildings adapted for the purpose, to houses specially erected and now known as sheep sheds. From the animal health and welfare standpoint good ventilation is the most important requirement. Bad ventilation leads to respiratory disorders, a fact which is generally appreciated by flockmasters and farm buildings advisers. Modern sheep sheds are, therefore, open at the front (except for the containing wall) a feature which allows of ample fresh air within the shed. The floor of the shed may be solid with litter on top, or slatted ; there is normally an external concrete enclosure where the flock can take advantage of occasional winter sunshine. Slats are usually constructed of timber ; the recommended size is about $1\frac{1}{2}$ inches wide with 1 inch gaps between the slats but there is much variation in practice. Floor space requirement is 9 to 12 square feet per ewe depending on her size. The ewes appear confident and comfortable on slatted floors and this is to be expected in

animals which by nature are adapted to moving and climbing over difficult terrain. Troughs are used for fodder and may also act as dividing walls between batches of 75–100 ewes.

176. The feeding of housed ewes is conventional, that is to say, hay or silage forming the basis with a concentrate supplement being given during the latter stages of pregnancy. Normally water is always available. Housing restricts exercise but this has not led to any problems of animal health; parturition, lactation and general health are no different compared with ewes kept out of doors. The system permits close supervision of the flock during lambing and this has improved lambing rates because of the survival of weaker lambs which, under outdoor conditions, often die of exposure in bad weather within the first twenty-four hours. Lambing ewes occupy individual pens for about two days or until the lambs are sufficiently strong to be turned out with them to pasture.

177. We see no problems of animal welfare in housed breeding flocks. Housing is particularly advantageous for older ewes unable to forage adequately for themselves. Flocks are kept indoors during the worst weather of winter and are normally well fed and supervised; they have their freedom for the greater part of the year. We do not see any need to impose mandatory requirements and are satisfied that the acceptance of advice on the technical and husbandry aspects of intensively housed breeding flocks should be sufficient to safeguard the welfare of the animals.

178. The housing of ewe lambs (often referred to as ewe hoggs) during their first winter, when they are between six and twelve months of age, has been a traditional practice in North Yorkshire. In the upland districts of that area "hogging barns" can still be seen and some are still used. The practice has been revived, but only to a limited extent, for purely economic reasons and now a number of hill farmers in Scotland, in the North of England and in Wales regularly winter their ewe hoggs indoors. Traditionally, the majority of hill farmers have sent their ewe hoggs away for the winter to lowland farms at an agreed cost per head. The practice was sound because the animals were given better grazing, during a vital growth period of their lives, than that available in winter on hill farms. During the past ten years the scarcity and high cost of lowland grazing for this purpose has stimulated the adoption of other methods of wintering ewe hoggs, including that of housing them.

179. The hoggs are brought into their winter quarters during November or December and remain there until April when they are returned to hill grazings. Housing varies, in some cases existing barns being used and in others special purpose sheep sheds. Floors are normally solid with litter on top in the traditional barns but slatted in the specially designed sheep sheds. Although they are expensive, slats are desirable because they maintain the feet of the sheep in firm, dry condition and, therefore, less prone to the disease of foot rot. This is important for animals which are intended to have a long breeding life. Floor space of 5 to 8 square feet per ewe hogg is normally allowed depending on the size of the animals and most flocks have daily access to an outdoor run on an enclosed part of the hill. They are fed indoors on hay or silage and often allowed a small concentrate supplement. Water is usually available at all times. We have no anxiety on animal

welfare grounds about this form of intensive husbandry. Confinement is only for about six months in the life of the animal and may merely be partial within this period. The young growing animal is protected from the elements and is relieved of the need to search for its food. We see no necessity for mandatory standards but would again stress the need for good ventilation of sheep houses, a floor space allowance of 5–8 square feet per animal and adequate feeding of young, growing animals.

180. The availability of barley as a fairly cheap concentrate and the decline in the acreage of roots (swedes and mangolds) has led some farmers to fatten lambs indoors rather than out of doors on the fodder crops mentioned. Lambs are usually purchased in the autumn at about six months old and housed until they are ready for slaughter. In other cases those lambs on the farm which remain unfinished in autumn are taken indoors for a short fattening period. Some hill farmers, rather than accept low prices for small store lambs, prefer to purchase concentrated feeding stuffs and fatten their lambs indoors.

181. Existing buildings such as barns, haysheds or cattle yards are used for housing fattening lambs with straw, shavings or sawdust for litter. Slatted floors are unnecessary for animals which are destined for slaughter in the space of a few weeks. The lambs are confined for the whole of the fattening period which may be from six to twelve weeks or more, according to their condition when housed and the type and level of diet. They may be fed hay, silage or roots, plus a concentrate supplement, or alternatively a high concentrate ration with a restricted allowance of roughage. This form of intensive husbandry as practised at present is acceptable. The lambs are generally well-fed and are not exposed to the elements. We see no cause for concern on animal welfare grounds provided there is good ventilation and plenty of floor space.

182. Current intensive sheep husbandry merely involves confinement for part of the year or part of the life of the animal. Permanent housing of breeding flocks or intensive fattening of lambs from birth to slaughter is not yet current practice. However, contemporary research on the use of hormones to promote out of season breeding may eventually have practical application. Furthermore, effort is being directed to developing more prolific strains, while the artificial rearing and fattening of lambs is now technically possible.

183. We believe that these advances in scientific knowledge could lead to the development of full-scale intensive sheep husbandry systems. If so, it should be the responsibility of the Farm Animal Welfare Standing Advisory Committee (Chapter 11) to keep them under review.

CHAPTER 9

TURKEYS, DUCKS AND RABBITS

184. In addition to the main classes of livestock dealt with in preceding chapters, there is a further range of animals and birds including turkeys, ducks, quail, guinea-fowl, rabbits and mink, which may also be managed intensively. Time has not permitted us to extend our study to all of these. Many of them are kept only on a small scale and methods may still be in an experimental stage but we have thought it important to devote some time to the welfare of turkeys, rabbits and ducks. Although the evidence we have received has included mention of the use of intensive methods with these animals, there has been little specific comment on turkeys and almost none on rabbits or ducks. We consider that the Farm Animal Welfare Standing Advisory Committee (Chapter 11) should review the use of intensive methods with classes of livestock which we have not been able to cover, with a view to recommending whether statutory controls may be necessary.

TURKEYS

185. Turkey production is a sizeable industry producing about eight million table birds annually in England and Wales at a value of about £20 million and has undergone great changes in recent years. It has always been a relatively specialised form of enterprise but has become increasingly so of late with the introduction of high performance hybrid stock and new methods of management. Like the domestic fowl, the turkey is capable of rapid genetic improvement and the last ten years have seen considerable changes in the pattern of the national flock. The traditional pure breeds are now rare; hybrids are dominant and large-scale commercial breeders have tended to replace the traditional breeders of pure varieties.

186. For convenience, turkey husbandry is often described under two headings, breeding stock and fattening stock, but in practice methods of housing may be similar. The distinction may have some relevance on welfare grounds in that the skill and close supervision required in breeding and the high individual value of many breeding birds makes it unlikely that they will suffer through poor or careless management.

187. Mature turkeys are fairly hardy but the young require warmth and protection in the first few weeks. Producers provide this by the use of brooder systems of varying types. Wire-floored tier brooders are commonly used but with indoor deep litter, floor brooding is the normal practice. The bird's need for artificial warmth varies according to the time of the year and external circumstances but the brooding period is never less than four or more than eight weeks. After leaving the brooder some form of cover is required for a short time but by 12 weeks turkeys are sufficiently hardy and are often kept permanently outside.

188. Turkeys are amenable to a variety of production methods. Many are still kept on the "range" or "compound" systems where they are permanently out of doors on grass in wire netting compounds. With breeding

birds the stocking density under this method is normally about 200 birds per acre but with birds intended for fattening it can be much higher, perhaps up to 1,500 per acre. Fold units, where the birds are held in groups of 10–30 in portable wire pens, which are moved periodicaly across grassland, are still popular, especially with breeding stock. Some simple forms of housing are also in use. Ventilation is extremely important in turkey management; a common form of housing is, therefore, to provide pole-barns or sheds where the upper part of the wall consists only of wire netting. The birds may stand on bare earth or deep litter of straw or wood shavings. For breeding stock in such housing each bird might have as much as 10 square feet or more of floor space but with fattening stock, particularly younger birds, the density would normally be much higher. The Motley system of housing consists of slatted or wire-floored verandah cabins raised on pillars above the ground. This was popular a few years ago as a method of controlling blackhead infection and is still used by some producers but has been largely superseded in recent years since the introduction of anti-blackhead drugs.

189. Controlled environment intensive housing offers less advantage with turkeys than it does with chickens but it is quite widely used. With laying stock control of lighting is advantageous to the producer as it enables the laying season to be modified. For fattening stock the main advantage of controlled environment lies in the conversion rates achieved. It is normally reserved for smaller birds up to about 10 to 15 lb. liveweight, which, with floor brooding, can spend the whole of their lives (12–16 weeks) in the same quarters. Stocking densities vary according to age. The normal average levels are $1\frac{1}{2}$ square feet per bird up to about eight weeks and $2\frac{1}{2}$ square feet from eight to twelve weeks, but individual producers sometimes exceed these.

190. Individual battery cages may be used for breeding hens but this is not yet common in Great Britain. They involve certain welfare considerations; the bird is closely restrained and with heavier birds there may be foot damage from the wire floor. In view of these considerations and the possibility that the use of individual cages may spread, we recommend that the subject should be examined by the Farm Animal Welfare Standing Advisory Committee.

191. As with other farm livestock, the welfare of turkeys depends largely on the skill and care devoted to them. As stated earlier, we have few anxieties on these grounds as regards breeding stock and we believe the advisory functions to be performed under our proposals will lead to the achievement of appropriate standards.

192. With fattening stock there are certain inherent difficulties in all the commonly-practised forms of husbandry. The seasonality of turkey production which encourages the build-up, in the autumn particularly, of large flocks may lead to inadequate inspection.

193. Overstocking may be a cause of trouble on all systems. With range units it leads to a deterioration of the ground on which the birds are kept and a build-up of parasites. With indoor units or roofed yards it may occur as the birds outgrow the available space and lead to pecking, vice and social stress. It is not possible to recommend maximum densities for

range systems; so much depends on climate, subsoil and the period of use, but we advocate that inspectors should pay fullest heed to the need for correct stocking rates. With indoor systems we recommend that birds up to eight weeks should always have at least $1\frac{1}{2}$ square feet of floor each, $2\frac{1}{2}$ square feet from eight to twelve weeks and 4 square feet above twelve weeks. This should apply equally to open-sided houses as to the "controlled environment" type. We recommend that wire floors should meet the specification suggested for caged poultry.

194. Though there are difficulties over advocating standards of ventilation, we believe that inspectors will need to give special consideration to it with enclosed houses.

195. We consider the de-beaking of turkeys cruel and objectionable, as it is with chickens, but we are not so confident that it could be eliminated without there being an increase in cannibalism. Observance of the stocking densities we recommend should help but even under good conditions outbreaks of this vice may occur. We conclude reluctantly that the lesser evil is to permit de-beaking to continue for a limited period as with loose-housed poultry. We recommend that research should be put in hand with a view to finding means to avoid the necessity for this practice and that the matter should be kept under review by the Farm Animal Welfare Standing Advisory Committee.

Ducks

196. Ducks are less amenable to intensive keeping than any of the classes of animals with which we have dealt. They are kept both for egg production and as table birds but egg production is at present somewhat below the pre-war annual average of about 150 million eggs. It is mostly small-scale employing conventional methods and we do not consider it to raise serious welfare questions. Table bird production has been rising over the last ten years and numbered 4·3 million in 1964. New and more efficient production methods have been introduced though it is problematic how far they should be considered intensive. Ducks are fairly hardy under varying weather conditions but less adaptable than most farm animals and the mature birds inevitably have to be given access to outdoor ranges.

197. The most intensive period of production occurs in the first month, for part of which the ducklings need supplementary heat. Brooding arrangements vary but the most common forms are batteries or tier brooders. With batteries the whole compartment is heated whereas with tier brooders the ducklings have a heated compartment and access to an unheated cage. Ducklings are often moved to fresh quarters after seven to ten days and may spend the remainder of their period before going outdoors at three to four weeks in "coolers" of various types. Provided the birds are kept at a moderate stocking density and the management is competent we see no welfare problems being raised by these methods.

198. The competence of management is the most important factor in the welfare of ducks once they move to outside quarters. Protection from weather need be minimal but protection from predators is vital. Food troughs and watering points must be sufficient in numbers and well-sited and it is essential that land should not be over stocked.

199. For breeding stock and laying birds houses are usually provided in which the ducks may be confined at night; usually there are nesting boxes. Provided the facilities are adequate and the management competent, we see no welfare problems arising with this type of management.

200. A form of de-beaking is some times practised with ducks which involves removing about one tenth of an inch of the upper mandible, usually when the birds are around ten days old. The object is to prevent down-pulling which may occur as the birds start to feather, leading to stress and poor carcase quality. We consider such de-beaking to be objectionable and while we are inclined to the opinion that it should be prohibited, we have insufficient information to justify a positive recommendation; we hope, however, that the Farm Animal Welfare Standing Advisory Committee will give consideration to the subject with a view to a positive statement as soon as practicable.

RABBITS

201. Intensive rabbit production has been mentioned in evidence given to us and we have thought it necessary to include it in our survey. We have found some difficulty in getting a comprehensive picture of table rabbit production because there are no authoritative national statistics. Although the term "broiler" rabbits is quite commonly used, there is in fact no comparison between the scale and the methods of production of table rabbits and broiler poultry. Rabbit production is intensive in that the animals are housed, closely confined and their food (which has a high protein content to encourage rapid growth) is brought to them.

202. In recent years a few big producers have attempted to make improvements in breeding stock which might make rapid large-scale production more economic. But for the foreseeable future the bulk of rabbits produced in Great Britain (perhaps 90 per cent.) will continue to come from small-scale units each producing in total a few hundred animals per annum. Few of these units occupy a man full-time and many of them are run as a hobby and are not strictly commercial in that labour costs may not be taken into account.

203. The limitations which the rabbit imposes on production techniques are related mainly to the dependence of the young on the mother. Attempts to run numbers of does together have failed. The doe and the litter (which commonly numbers about six but may be much larger) must be kept together as a unit until weaning at around four weeks. Most producers find it convenient to keep litters together beyond that stage until they are ready for slaughter at about eight weeks. Secondly, it is difficult to economise on overheads. In fact, rabbits need more attention than do other forms of livestock; in large-scale commercial units labour costs are high, partly because management is a skilled operation. Rabbits are nervous and sensitive, and so respond to sympathetic treatment.

204. Though the traditional habit of gathering green stuff for rabbits continues, production on any significant scale involves purchase of food and this is likely to be as expensive. The normal feeding regime is based on the use of commercial compound feeding pellets with supplementary hay for roughage.

205. Housing may vary widely. Some purpose-built "battery" cages, with mechanised feeding and droppings disposal are available but the capital cost is high and the majority of producers build their own equipment. The most common installation is a hutch or cage which, for fattening stock, is usually about 4 feet by 2 feet. The buck is kept in a similar sized cage. Where the same cages are used from birth to maturity, a nesting box is provided for part of the time.

206. The floors of the cages may be solid with some litter but producers often find it preferable to use wire mesh floors as being more hygienic and labour-saving. Though rabbits seem comfortable on these floors there is a welfare problem in that sore hocks are occasionally encountered, particularly among heavier breeding animals. Some producers believe this soreness to be a genetic fault; it is said that some strains do not react in this way. We hope our suggestion as to flooring in paragraph 208 would meet this point.

207. Rabbits need protection from extremes of climate. Adequate ventilation is vital and most producers recognise that this is the best way of avoiding respiratory troubles.

208. We do not believe it necessary to recommend mandatory controls upon rabbit production, but we consider, in view of the possibility of changes in the structure of the industry, that the Farm Animal Welfare Standing Advisory Committee should keep it under review. We suggest that, for the time being, cages for single animals should provide a minimum of 1 square foot per lb. liveweight; multiple cages should provide $\frac{1}{2}$ square foot per lb. liveweight housed. The floors should be of rigid square wire mesh giving a smooth upper surface. We do not consider that light wire netting is suitable. It is important that producers should keep in touch with, and take advice from, the Veterinary Service in this respect.

CHAPTER 10

STOCKMANSHIP, EDUCATION AND TRAINING

209. We have been impressed with the importance of the standard of management and stockmanship for the welfare of farm livestock. All the evidence we have received from individuals and organisations with practical experience of farming has emphasised this and our own observations have been confirmatory. We are convinced that it is of great significance for all kinds of livestock management but that intensive methods demand an even higher standard than more traditional ones. This is because intensification leads to greater sophistication of methods of husbandry demanding more knowledge, skill and attention from those in charge and because the increased scale of the enterprises tends to result in each man being responsible for many more animals. Intensive livestock husbandry is some times loosely referred to as " factory farming " with the implication that it is possible for farming to be a purely mechanical process eliminating the need for any great human skill or judgement in day-to-day supervision. The facts do not justify this belief. Large-scale operations and carefully designed buildings can facilitate the use of mechanical aids, but in our opinion the basic requirement of expert human supervision remains and is, indeed, enhanced with intensive methods. We consider it probable that future progress in methods of animal husbandry is likely to require a still higher standard of management and stockmanship, rather than to diminish the importance of the human element. Consequently we have given thought to how the training and selection of personnel might be improved.

210. The qualities which are required to make a successful stockman are not easy to assess. He must have an adequate knowledge of the particular kind of animal with which he is concerned, its habits and behaviour, its nutritional and environmental requirements, its reproduction, and its liability to sickness and infection. He must have a full understanding of the husbandry system that is being operated and of the likely reactions of the animals to the regime. He must be skilful in carrying out the various operations involved. Given an appropriate level of intelligence and dexterity, these are qualities which he can acquire from formal teaching and practical instructions. There is, however, the more personal quality of " being good with animals " which is difficult to define but which we have been assured, and we accept, is very important. It can be recognised both by the confidence and understanding with which the person tends the animals and by their response in showing greater contentment and thrift. Many people believe this quality to be inborn but experience with animals clearly has much to do with its development. It is probable that persons who have this quality can impart it in large measure by practical example, if not by formal instruction. In our opinion much attention should be paid to it in the training of stockmen and means should be found to take it fully into account in assessing their quality.

211. We believe that the care of animals could be greatly improved by the more extended use of educational facilities for stockmen and the wider recognition of the value of such training in association with practical training on the farm. This is a subject on which we hesitate to touch, both because we are not as a Committee specially qualified to comment on it and because it falls partly within the scope of the Advisory Committee on Agricultural Education appointed by the National Advisory Council on Education for Industry and Commerce. Moreover it will also fall in part to the Training Board for Agriculture which we are glad to learn is likely to be set up next year. We have discussed with expert witnesses the relationship of education to our field of enquiry and, being convinced of its relevance, we believe that we can make some useful comments regarding the training of stockmen. We use the word stockman to describe the person whose job it is to look after the animals; some of our comments will apply also to the training of those employed at the rather higher level of supervisor or manager. We hope it will be deemed appropriate for our views to be referred to the Advisory Committee.

212. The changes which have taken place in agriculture recently have posed problems for agricultural education. The decline in size of the farm labour force and the speed of change resulting from technical innovations make it difficult to foresee both the scale and nature of the educational facilities which will be required in the future. Theoretical instruction needs to be combined with realistic practical instruction with installations such as are in current use in the agricultural industry and which consequently may need to be on a fairly large scale. The rise of intensive husbandry and the sophistication of methods appear likely to result in an increasing need for trained technicians with aptitiude for the care of animals. We recommend therefore that the provision and scale of appropriate training facilities should be reviewed and that all possible steps to encourage the employment of trained stockmen on intensive husbandry units should be taken.

213. Agricultural education in England and Wales is at present provided on three fairly distinct levels. First, there are the degree courses of three or more years' duration provided by a number of the Universities. Secondly, there are the diploma courses, involving two or three years' study, provided by the five Agricultural Colleges in England and Wales and two of the L.E.A. Institutes of Agriculture. These are the levels of training that would be appropriate to a potential manager. Thirdly, there are the one year courses and supplementary courses which are offered by all the L.E.A. Farm Institutes (36 in all). This is the level from which one might expect stockmen to be recruited. The main farm institute course is in general agriculture for the National Certificate in Agriculture but almost all of the Institutes provide additional courses, adapted to the needs of agriculture in the district. The National Certificate course includes some basic instruction in animal husbandry and some of the other courses specialise in this subject or some branch of it. The pattern of agricultural education is rather different in Scotland but instruction in stockmanship below diploma level is available under College or L.E.A. auspices in a variety of courses.

214. The education of a stockman should do two things in so far as animal welfare is concerned, as we have outlined in paragraph 210. The first, and major one, is to develop in the student (who will have spent some time

on the farm previously) the understanding and skill which he will need for tending the animals. The second, and in many respects equally important, is to develop as far as possible his capacity for being good with animals and to divert to other occupations those who are temperamentally or otherwise incapable of acquiring this facility, so as to ensure that they do not have charge of stock. Our enquiries lead us to believe that those responsible for Farm Institutes are often alive to this latter point and take it into account in recommending students for particular positions. Inevitably, only a minority of those recruited as stockmen come from Farm Institutes. The majority start without any evidence of their aptitude for the care of animals and do not receive any formal training as stockmen. They are expected to learn by experience on the job. We are dissatisfied that this should be so and we hope that everything possible will be done to encourage the recruitment of trained stockmen for all types of enterprise, especially intensive ones and to develop the training of young workers for such enterprises.

215. We think that there may be a need to widen the range of courses available to the potential stockman. In saying this we take account of, and commend, the initiative taken by some education authorities to develop additional and supplementary courses in animal husbandry. We hope that this trend will continue and will be given full support by the responsible authorities. We hope too that our comments about the welfare of intensively kept animals will be borne in mind in the organisation of such courses. The courses, which should have a strong practical element, should include information on the subjects we have outlined in paragraph 210. These subjects should be taught in the context of the particular types of husbandry which are in use and of the animal's reaction to them. This may involve the use of fairly large and costly installations, which may be difficult to justify at small Institutes. Co-operation between Institutes and rationalisation of courses might go some way to overcome this difficulty, but the greater need is for co-operation between the industry and educational establishments so that students can obtain practical experience in a commercial setting. Greater use might also be made of " sandwich " courses.

216. It is important to try to induce some sense of vocation in the students ; there is a real danger that large-scale intensive methods involving great numbers of animals, possibly in surroundings which are uncomfortable to man, can lead to a debasement in the stockman's attitude to the lives for which he has responsibility. A stockman obviously cannot be fully qualified to deal with all the difficulties that arise in tending his animals. But it is essential that he has the basic information to be able to judge when to call for expert advice.

217. We appreciate that improvements in education cannot have an early effect on the general levels of stockmanship. In particular, the relatively small proportion of the total number of stockmen which the Institutes supply, makes it difficult to influence the general standard. We should hope that the spread of day release courses will prove helpful here. Day release training is proving increasingly popular in general agriculture (though it is significant to note that in poultry husbandry, where many of the larger enterprises believe that they are best qualified to train their own staff, it

has found little support). We hope too, that with the establishment of the Training Board greater attention will be given to training on the farm.

218. The wage structure in agriculture pays little regard to formal qualifications. Stockmen are more likely to be rewarded for their results than for the training they have received. This is a powerful factor inhibiting the educational system from achieving the improved standards of skill and enlightenment which intensive methods demand, while not necessarily otherwise contrary to the interests of animal welfare. Nevertheless, we consider that recognition of suitable qualifications for stockmen in the wage structure is desirable.

219. The mandatory standards which we have recommended we consider should be sufficient to ensure so far as is possible acceptable conditions for the animals given an average level of management and stockmanship. An Inspectorate will be required to enforce these regulations and we believe that advisory work will be a necessary and complementary part of its duties. We are of opinion that such advisory work can be a very valuable supplement to the education of stockmen, both those that have been trained on the job and those who have formal qualifications, and can help materially in bringing about a general improvement in standards of animal care. We think it important, in the achievement of this general improvement, that there should be close contact and co-operation at all levels between the staff of farm institutes and the Veterinary Service.

CHAPTER 11

IMPLEMENTATION

220. We have described in Chapter 3 the law relating to animal welfare. It has been strongly represented to us that the present state of the law is inadequate in relation to the welfare and protection of farm animals. The Protection of Animals Act 1911 (and the corresponding Scottish Act of 1912) confers little protection on farm animals because of the inadequacy of its definitions in relation to farming practices, and the inability of the authorities to take effective enforcement action under it. In framing our recommendations therefore, we have realised that these will involve new legislation, specifically relating to the welfare of animals kept for food production.

221. At the same time, we are of the opinion that the standards we have recommended may quickly become obsolescent. Agriculture is progressive and we would be concerned if our recommendations had the effect of putting the industry in a permanent strait-jacket. This is why we suggest later that, under safeguards, there must be freedom to experiment with new techniques. We also feel most strongly that, in the light of further experience, it must be possible to modify any standards laid down without the necessity for constantly amending the main legislative instrument. Therefore we recommend that any Act necessary to make our recommendations effective should be in the form of an enabling Act, so that Statutory Instruments can be made to implement them and to give early effect to desirable changes which may prove necessary.

222. Continuing developments in education and training for stockmanship, together with a stimulation of effort on the part of all those who regularly visit farms in an advisory capacity, will further help to safeguard the walfare of farm animals. There is, however, a more difficult area to define or to provide for, but our task would not be complete without the attempt.

223. There are many factors affecting the welfare of animals which are difficult or impossible to control effectively by statutory requirements (for example, the quality of stockmanship) but which, individually or cumulatively, may have a profound effect. We are concerned that it could still be possible for animals to be kept in full conformity with the standards we have recommended and yet to suffer " pain " or " cruelty " through, for example, neglect, or wilful refusal to accept advice on measures which would remedy their conditions. Again, we do not believe that the 1911 Act provides sufficient cover for this situation and we consider additional legislation to be necessary. One of the problems is to establish a clearer definition of " suffering " and in this respect we have studied with great interest the Report of the Departmental Committee on Experiments on Animals (The Littlewood Report). We endorse the concept of suffering which they provide in paragraph 181 of that report—

> " (*a*) discomfort (such as may be characterised by such negative signs as poor condition, torpor, diminished appetite) ;

(*b*) stress (i.e. a condition of tension or anxiety predictable or readily explicable from environmental causes whether distinct from or including physical causes);

(*c*) pain (recognisable by more positive signs such as struggling, screaming or squealing, convulsions, severe palpitation)."

224. We recommend that any Act to provide for the welfare of farm animals resulting from our Report should include this definition within it, and should make it an offence to cause, or permit to continue, avoidable suffering so defined. It should then be open to the appropriate inspecting authority, at senior levels, to prosecute for this offence when warning and advice have been offered and disregarded. We do not envisage that many such cases would come before the Courts. But the sanctions provided by such legal powers would greatly assist the inspectorate in its task of covering the entire field of animal welfare on farms. In the last resort the Courts should have the power to order such action as will terminate the suffering, for example by treatment, disposal, or destruction.

225. We recognise that the enforcement of our recommendations will prove a formidable task. With this in mind, we have endeavoured to cast them in as simple a form as possible, and we would deprecate any attempt to complicate them by, for example, devising over-elaborate schedules of space and ventilation requirements. Such a move would not be in the best interests of either the animals or the industry, since it could well make enforcement impracticable and compliance a source of constant difficulty. A period of notice would, of course, have to be provided in some instances in order that the industry could adjust itself within the framework of the new requirements. Thereafter, we recommend that the appropriate authority, to enforce the Regulations would be the State Veterinary Service under the control of the Minister of Agriculture, Fisheries and Food. We envisage that the routine inspections would be undertaken by technical staff under the supervision of the professional veterinary officers; but that the advice of senior professional staff would be sought before any prosecution was initiated.

226. We have considered the possibility of a licensing system for all farms with livestock or poultry but have rejected this idea as cumbersome and unnecessary. We recommend that the Act and Regulations made under it be enforced through the Courts, as are the Farm Safety Regulations.

227. We feel that there are many aspects of this whole problem of animal welfare on farms where more knowledge and experience is required before final conclusions can be reached and which must be kept under review. New methods of husbandry may arise, or other animals may be exploited, for which controls may be required. It will be necessary for somebody to advise the Minister on how to proceed with these studies or investigations which we have referred to earlier in the report; and to suggest further lines of study arising from the experience of the working of our recommendations or from these new developments. In addition, as suggested in paragraph 221 above, there must be facilities for experimentation with new techniques which may necessitate some dispensation from any legal requirements arising from our recommendations. The same body could advise the Minister on the issue of licences giving such dispensation to approved projects.

228. We recommend, therefore, that provision should be made in the Act for the establishment of a Farm Animal Welfare Standing Advisory

Committee to advise the Minister on all these matters. It should not be representative of the interests concerned, but the persons appointed should serve because of their knowledge and experience in various fields and their personal qualities. The Committee should not be more than ten in number, and should include within its membership a veterinarian, an expert on animal behaviour or comparative psychology, a zoologist or physiologist, persons knowledgeable in animal husbandry and farm buildings and a legal expert. Members of the Ministry staff should be consulted as necessary.

229. There are two further general points which we wish to make. First, it will be seen that we have found it necessary to make recommendations which would have the effect of laying down certain basic standards for animal welfare. We would most emphatically wish to state, however, that in our opinion the great majority of farmers are concerned to ensure the welfare and health of their stock, and our Report should not be read as being in any way a condemnation of the attitude of farmers in general. We feel it necessary to stress this conviction to avoid misunderstanding.

230. Secondly, we recognise that the effect of some of our recommendations may be to increase costs in certain sectors of the industry, at least in the initial stages. We believe that public concern about animal welfare on farms is such that this will be understood and consumers will be prepared to meet any marginal extra costs. We would, however, be concerned if the standards we have recommended for adoption in this country had the result of encouraging imports produced overseas under systems contrary to these. This might largely invalidate the intention of our Report; we therefore recommend that the Government take such steps as may be practicable to ensure that it does not happen.

231. Finally we would like to thank all those who have helped us in our deliberations. We could not have completed our task within the time without the fullest co-operation from the industry, the welfare societies, Ministry officers and others who have given freely to their time and facilities. In particular we would wish to name two people. Mr. A. G. Beynon, our Veterinary Assessor, has devoted a great deal of his time and energy to assisting us; we have been greatly helped by his wise counsel on professional matters and we gladly take this opportunity of thanking him. We also wish to place on record our gratitude to our Secretary, Mr. David Evans. This is in no way a mere formality. The task of co-ordinating the Committee's work and producing the Report within our time-table has been an arduous one; and the fact that he has discharged it so cheerfully and efficiently, whilst at the same time developing close and friendly relations with every member of the Committee, is an indication of the debt we owe him and which we gladly acknowledge.

SUMMARY OF RECOMMENDATIONS

1. The principles of animal welfare on which we have based our judgements are set out fully in Chapter 4. From applying these principles to intensive husbandry methods we have concluded that the use of such methods should not in itself be regarded as objectionable and may often benefit the animals; but certain practices are contrary to animal welfare and need to be controlled. We have therefore made recommendations for statutory provisions and these are set out in paragraph 4 below et seq.

2. In addition to the mandatory standards which we recommend we have concluded that there are some practices and standards which are generally desirable in the interest of animal welfare but which should not, for various reasons, be given statutory force. These are generally recognized as conforming with good husbandry. They are too numerous and, in some cases, complex, to summarise here but they are fully set out in the relevant parts of the text. It is our belief that these suggestions should be incorporated into advice to producers which we envisage will be a routine part of the work of the State Veterinary Service in enforcing mandatory standards.

3. We believe the qualities and skills of those responsible for animals are most important for their welfare. We cover this subject in Chapter 10 and we recommend that the provision and scale of appropriate training facilities should be reviewed and all possible steps to encourage the employment of trained stockmen on intensive husbandry units should be taken.

Recommended statutory provisions

4. The existing animal welfare legislation does not adequately safeguard farm animals and a new Act is needed incorporating a fuller definition of suffering and enabling Ministers to make regulations requiring conditions for particular animals. (224)

5. The Act and regulations should be enforced by the State Veterinary Service, and a Statutory Farm Animal Welfare Standing Advisory Committee should be set up to advise Ministers. (225, 228)

6. Steps should be taken to ensure that the intention of this report is not prejudiced by imports of food produced under unacceptable systems. (230)

7. The quantities of mineral additives in manufactured feedingstuffs should be clearly stated on the container. The feeding of arsenical compounds should be prohibited save on veterinary prescription for treatment. (39)

Poultry

8. Cages for laying poultry should not contain more than three birds. The three-bird cage should measure at least 20 inches wide and 17 inches deep and have an average height of 18 inches with the lowest part not less than 16 inches. For two birds the width should be 16 inches and for one bird 12 inches. The floor of the cage should consist of rectangular metal mesh, no finer than number 10 gauge. (65, 67, 68)

9. The gangway in front of any vertical tier should be at least two thirds as wide as the tier is high and the floor of the bottom cages should

be 12 inches above the level of the gangway. No more than three tiers should be permitted from any one level. (73)

10. Deep litter laying birds should have at least 3 square feet of floor space per bird; where deep litter is combined with a raised wire floor or slatted area this should not exceed one third of the total and the allowance should be at least 2½ square feet per bird overall. (79)

11. Loose housing of poultry on wire floors or slats should be prohibited. (81)

12. Broilers above six weeks should have at least one square foot of floor space. (90)

13. Poultry houses should be provided with lighting bright enough for all the birds to be seen clearly for routine inspection. (82)

De-beaking

14. The de-beaking of battery birds and broilers should be prohibited. The de-beaking of deep litter birds, turkeys and ducks should be reviewed by the Farm Animal Welfare Standing Advisory Committee with a view to early prohibition. The use of spectacles or blinkers should be prohibited and dubbing should be prohibited in birds of more than 5 days of age. (98, 99, 100, 101, 102, 195, 200)

Pigs

15. Housed pigs, between 150 lb.–210 lb. liveweight, should have a minimum of eight square feet of floor space per animal. Those above 210 lb. should have a minimum of 10 square feet. (118)

16. Pig houses should be provided with lighting bright enough for all the animals to be seen clearly for routine inspection. (122)

17. Docking should be prohibited save as remedial treatment by a veterinary surgeon. (124)

18. Pregnant sows should not be kept without daily exercise in quarters which do not permit them to turn round and, in any case, should not be tethered indoors. (125)

Cattle

19. Milk substitute or other manufactured diets for calves should be so reinforced with iron in a suitable form as to ensure that the normal intake of the animal is in no wise deficient in this element. All calves should be provided with palatable roughage daily at all ages from a week after birth. The obsolescent practice of periodic bleeding should be made illegal. (145)

20. The yoking or close tethering of calves, except for short periods and for specific purposes, should be prohibited. (148)

21. Individual pens for calves should be of a sufficient size to allow the calf freedom of movement including the ability to turn round, and those for calves of 200 to 300 lb. liveweight should measure at least 5 feet by 3 feet 6 inches; the sides should not be solid above 2 feet from the floor. Pens for accommodating more than one calf of this size should not allow less than 12 square feet per animal. (150)

22. Calves should be provided with sufficient clean straw or other bedding on which to lie down. (152)

23. The restraint by prolonged or permanent short tethering or yoking of animals being fattened for beef production should be prohibited forthwith and all forms of tethering should be prohibited as soon as practicable. (162)

24. Housed cattle of more than 500 lb. liveweight should each have a minimum space of 25 square feet and this should apply to all forms of flooring. (164)

25. Bedding should be provided for animals kept in houses or yards. Where slatted floors are used, not more than half the animals' living space should be slatted and the non-slatted part should include provision of bedding. (169)

Turkeys

26. Housed turkeys should have at least $1\frac{1}{2}$ square feet of floor space up to eight weeks; $2\frac{1}{2}$ square feet from 8 to 12 weeks and 4 square feet above 12 weeks. (193)

27. Wire floors should meet the specification suggested for caged poultry and the use of individual battery cages for turkeys should be examined by the Farm Animal Welfare Standing Advisory Committee. (190, 193)

Other animals

28. We do not recommend statutory standards for housing of sheep or rabbits but we believe that husbandry practices for these should be reviewed by the Farm Animal Welfare Standing Advisory Committee. (183, 208)

F. W. ROGERS BRAMBELL (*Chairman*).
D. S. BARBOUR.
ISOBEL BARNETT.
T. K. EWER.
ALEC HOBSON.
H. PITCHFORTH.
WALTER R. SMITH.
W. H. THORPE.
F. J. WINSHIP.

A. G. BEYNON (*Assessor*).
DAVID EVANS (*Secretary*).

APPENDIX I

Evidence presented

The following gave written and oral evidence:

Animal Health Trust	W. R. Wooldridge, Esq., M.Sc., D.V.Sc., F.R.C.V.S., F.R.I.C. D. H. L. Rollinson, Esq., B.Sc., M.R.C.V.S. K. C. Sellars, Esq., B.Sc., M.R.C.V.S., D.V.S.M. R. F. Gordon, Esq., M.R.C.V.S. A. L. Ogden, Esq.
British Chicken Association	D. W. B. Sainsbury, Esq., M.A., B.Sc., Ph.D., M.R.C.V.S.
British Egg Association	D. N. Lowe, Esq.
British Veterinary Association ...	D. F. Oliver, Esq., B.Sc., M.R.C.V.S. J. S. Garside, Esq., Ph.D., M.R.C.V.S., D.V.S.D. C. M. Gould, Esq., M.A., B.Sc., M.R.C.V.S. S. L. Hignett, Esq., B.Sc., M.R.C.V.S. D. W. B. Sainsbury, Esq., M.A., B.Sc., Ph.D., M.R.C.V.S.
Denkavit N.V.	Mr. W. A. Pesch.
Mrs. Ruth Harrison.	
D. Harrison, Esq., F.R.I.B.A., A.M.T.P.I.	
Humane Farming Campaign ...	M. Fryer, Esq. Miss Margaret Cooper. Miss Irene M. Heaton. The Very Revd. Eryl S. Thomas, M.A. Revd. James Turnbull.
National Agricultural Advisory Service	W. Emrys Jones, Esq., B.Sc. (Agric.). R. Coles, Esq., M.Sc. (Agric.), M.Sc. (Econ.), B.A., Ph.D., D.Sc. (Agric.). T. Allsop, Esq. D. C. Barber, Esq., M.R.A.C.
National Farmers' Union	R. Saunders, Esq. M. A. B. Bolton, Esq., M.A., J.P. T. Parfitt, Esq.
National Federation of Women's Institutes	Miss K. Doman, M.B.E. Miss M. R. Withall.
Pig Health Control Association ...	A. V. Pelly, Esq., M.V.O., N.D.A. R. F. W. Goodwin, Esq., M.A., Ph.D., B.Sc., M.R.C.V.S.

Pig Industry Development Authority	E. P. Day, Esq. D. R. Melrose, Esq., B.Sc., M.R.C.V.S. G. White, Esq. I. C. Beattie, Esq., B.Sc., Dip.Agric., M.Agric.Sc.
Poultry and Egg Producers of Great Britain.	T. J. Aley, F.P.A.
Quality Veal Producers' Association	A. F. Paton, Esq. J. R. Byron, Esq. F. J. Cooper, Esq. Miss J. M. Malcolm.
Royal College of Veterinary Surgeons	Professor G. F. Boddie, B.Sc., F.R.F.E., F.R.C.V.S. R. E. Glover, Esq., F.R.C.V.S., M.A., D.Sc. G. N. Gould, Esq., F.R.C.V.S., J.P.
Royal Society for the Prevention of Cruelty to Animals.	R. F. Rattray, Esq., M.A., Ph.D. Lt.-Col. D. I. C. Tennant, M.R.C.V.S., M.R.S.H. Miss O. R. Cossons. J. Hall, Esq., O.B.E. B. P. Howell, Esq., M.B.E. Major Priestley.
Scottish Farmers' Union	W. Campbell, Esq. J. L. Blackley, Esq. H. W. Melville, Esq.
Central Council of Societies in Scotland for Prevention of Cruelty to Animals.	L. G. Langwill, Esq., C.A. G. S. Drysdale, Esq., A.C.I.S.
Universities Federation for Animal Welfare.	Professor A. T. Phillipson, M.R.C.V.S., M.A., Ph.D. (C.A.), D.V.Sc. (Copenhagen), F.R.S.E. R. Ewbank, Esq., B.V.Sc., M.R.C.V.S. Major C. W. Hume, O.B.E., M.C., B.Sc., M.I.Biol. Major W. S. Scott, M.R.C.V.S. M. Jones, Esq., B.V.M.S., M.R.C.V.S.

The following gave written evidence:

Agricultural Land Service.
Mrs. A. M. Allen.
J. C. Anakin, Esq.
Animal Defence and Anti-Vivisection Society.
Association of the British Pharmaceutical Industry.
Association of Green Crop Driers.
Miss Gwendolen Barter.
J. R. Bellerby, Esq.

Mark Bourne, Esq.
B. H. Bridge, Esq.
A. Brownlee, Esq., M.R.C.V.S.
O. H. Cantrill, Esq.
Council of Justice to Animals and Humane Slaughter Association.
Country Landowners' Association.
Mrs. Doris Davy, M.A.
Ecclesbourne Research Laboratories.
Miss M. A. Everitt.
Farm Buildings Association.
H. P. Godfrey, Esq.
Dr. W. A. M. Gordon.
B. Kirby., Esq., B. Vet. Med., M.R.C.V.S.
G. Knowles, Esq.
The Laying Battery Manufacturers Association of Great Britain.
Professor Kenneth Mather, C.B.E., D.Sc., F.R.S.
Professor R. A. McCance, C.B.E., F.R.S.
Roger Moody, Esq.
National Agricultural Advisory Association.
Mrs. R. H. Oakley.
Rev. K. R. Pilcher.
Poultry Liaison.
Mrs. Jean Pyke.
L. Reginald Reakes, Esq.
Lieut. Cmdr. G. Reynolds, M.B.E., R.N.
Royal Institute of British Architects.
A. Robertson, Esq., F.R.S.
Kenneth Sandeman, Esq.
D. M. Skinner, Esq.
Charles Spalton & Sons Ltd.
Stockbuildings Ltd.
J. Symons, Esq.
John Syrett, Esq.
The Soil Association.
Thornber Brothers.
Ulster Royal Society for the Prevention of Cruelty to Animals.
T. E. Whittle, Esq., B.Sc., N.D.P., F.P.H.
Dr. D. G. M. Wood-Gush.

Oral evidence only:
J. S. Hall, Esq., B.Sc.
Sydney Jennings, Esq., M.R.C.V.S.

When the Committee visited Denmark they attended a meeting at the Danish Ministry of Agriculture at which the following were present:

Herr J. Jensen
Herr J. Premé
Herr L. Simonsen
Herr H. Wanscher
} Ministry of Agriculture.

Herr D. Davidsen—National Poultry Breeding Committee.
Fr. E. Mols—Ministry of Justice.
Herr A. Pedersen—Agricultural Council.
Dr. C. Wederlin—Chief Veterinary Officer.

APPENDIX II

Visits made by the Committee

Alexander & Angell Ltd., Brockworth, Gloucestershire.
D. Holden, Esq., Yewtree Farm, Gotherington, Gloucestershire.
M. Wilson, Esq., West End Farm, Darrington, Pontefract, Yorkshire.
Perry Brothers Ltd., Kinsley Carr Farm, Hemsworth, Pontefract, Yorkshire.
J. and E. Dickinson Ltd., Longley Farm, Holmfirth, Huddersfield, Yorkshire.
J. T. Calligan, Esq., Mill Hill Farms Ltd., Mirfield, Yorkshire.
K. Oakes, Esq., Grange Farm, Batley, Yorkshire.
T. W. Sturdy, Esq., Newsholme Farm, Spofford, Harrogate, Yorkshire.
J. H. Dent, Esq., Park House Farm, Walshford, Yorkshire.
J. S. Richards, Esq., Yorkshire Turkey Producers, Kexby, Yorkshire.
D. Friday, Esq., Chequer Tree Farm, Cranbrook, Kent.
R. Denny, Esq., Merrieweather, Mayfield, Sussex.
J. Worley, Esq., Moat Farm, Chart Sutton, Kent.
P. Harker, Esq., Court Lodge Farm, Harrietsham, Kent.
J. L. Hocken, Esq., Budgeside, Hawkenbury, Kent.
P. Cazalet, Esq., Home Farm, Shipbourne, Kent.
A. S. Furniss, Esq., Old Mill House Farm, Crowborough, Sussex.
O. S. Simon, Esq., Crowland Farm, Ancaster, Nottinghamshire.
J. B. Eastwood, Esq., Lurchar Farm, Farnsfield, Nottinghamshire.
A. Dulson, Esq., Coxmoor Farm, Kirkby in Ashfield, Nottinghamshire.
D. Watkinson, Esq., Griffen Farms Ltd., Lacock, Chippenham, Wiltshire.
W. E. and D. T. Cave Ltd., Lower House Farm, Everleigh, Wiltshire.
W. Carney, Esq., South Grove Farm, Collingbourne, Wiltshire.
British Beef Company, Brown Street Farm, Stowmarket, Suffolk.
T. Brennand Robinson, Esq., Lolworth Grange, Lolworth, Cambridgeshire.
Peter Ward, Esq., Meldreth Turkey Farms, Meldreth, Cambridgeshire.
J. A. Clayton, Esq., Ivy Farm, Royston, Cambridgeshire.
C. J. Millard, Esq., Eltisley, Cambridgeshire.
J. T. Beresford, Esq., Manor Farm, Chilmark, Wiltshire.
Christopher Hill Ltd., Donhead St. Andrew, near Shaftesbury, Wiltshire.
Peter Stroude, Esq., Home Farm, Long Stanton, Cambridgeshire.
K. Day, Esq., Flat Road, Willingham, Cambridgeshire.
Professor M. McG. Cooper, University of Newcastle Department of Agriculture, Cockle Park, Northumberland.
Major W. Rayner Stowell, Harelaw, Longhorsley, Northumberland.
Andrew Robinson, Esq., Glantlees, Newton on Moor, Longframlington, Northumberland.
Muir of Pert Farms Ltd., Tealing, Dundee, Angus.
Messrs. Sainsbury Ltd., Inverquhomery, Longside, Aberdeenshire.
A. R. Manson, Scoutbog, Oldmeldrum, Aberdeenshire.
Maitland Mackie, Esq., Mackie's Aberdeen Dairy Co., Ltd., Easterton and Westerton, Rothienorman, Aberdeenshire.
G. Wishart, Esq., Saphock, Oldmeldrum, Aberdeenshire.
R. A. Evans, Esq., Gwern Hywel Bach, Yspytty, Betws-y-Coed, Carnarvonshire.
A. Ellis Jones, Esq., Bryn Carcut, Llangernyw, Denbighshire.
G. Brooks, Esq., Ystrad Farm, Denbighshire.
R. H. Bailey, Esq., Brynhyfryd Poultry Farm, Ruthin, Denbighshire.

A. Bletcher, Esq., Argoed Hall Farm, Mold, Flintshire.
Culham Farms, Hurley, near Maidenhead, Berkshire.
J. Carlisle, Esq., Cherryvale, Spa Road, Ballynahinch, County Down.
Agricultural Research Institute, Hillsborough, County Down.
H. Jordan, Esq., Lissue, Lisburn, County Down.
J. Jordan, Esq., Drumbane House, Moira, County Down.
Herr Nysø Avlsgaard, Praestø, Denmark.
Herr Kaj Nielsen, Aulebjerg, Strøby, Denmark.
Herr Hans Pedersen, Orsted, Havdrup, near Roskilde.
Major Branth, Kavalergaard, Denmark.
Herr Aage Nielsen, Havby Bygaard, Jungshoved, Praestø, Denmark.
Herr Lars Jensen, Rejnstrup, Denmark.
Denkavit, N.V., Voorthuizen, Netherlands.
Bernard Matthews Ltd., Great Witchingham Hall, Great Witchingham, Norwich, Norfolk.
Stephen Vincent, Esq., Bawburgh Hall, Norwich, Norfolk.
Frank Peele, Esq., Rookery Farm, Thuxton, Norwich, Norfolk.
J. L. Matthews, Esq., 19 Regent Street, Bletchley, Buckinghamshire.
A. E. Moss, Esq., White Cloud Farm, Tring, Hertfordshire.
Dale Turkeys Ltd., Caynham Court, Ludlow, Shropshire.

APPENDIX III

TECHNICAL COMMITTEE ON WELFARE OF ANIMALS IN INTENSIVE LIVESTOCK HUSBANDRY SYSTEMS

THE ASSESSMENT OF PAIN AND DISTRESS IN ANIMALS

BY W. H. THORPE, M.A., SC.D., F.R.S.
(Director, Sub-Dept. of Animal Behaviour, Cambridge University)

There are two opposite pitfalls which beset those who, like ourselves, attempt to decide upon the limits of physical injury and restraint which it is not permissible for a civilised people to exceed in their treatment of domestic animals. The first is the error of supposing that domestic animals in their feelings and anxieties are essentially like human beings; the second is the equally serious error of assuming that they are mere insentient automata. To avoid these two pitfalls is relatively easy. To know what path to choose between them is extremely difficult. If we consider that certain treatments may cause pain or suffering we then have to examine more carefully what we mean by these words. There is no doubt that wild and domestic animals feel pain, usually more or less transient. But it is vitally important to distinguish the sensation of pain which is an essential safeguard of the animal body, from the idea of "suffering" as experienced by human beings. Human suffering is often very largely a matter of prolonged anxiety and imaginative anticipation of further pain—both of which are incomparably less well developed in most animals as far as we can see. There is no doubt that many types of animals live in the present to an extent which it is hard for a human being to conceive. But, even so, many animals not only remember the past but fear the future, at least to some degree; and the extent to which they do so is of vital moment to our task. Moreover, it must be remembered that most of the animals which are employed in husbandry have a social life of a fairly advanced nature (as I believe my subsequent discussion will show) and we must therefore be doubly careful in coming to any decisions as to what is permissible, and take into account all the evidence available to us as to the degree of the animal's social development in nature.

There are two fundamental types of scientific evidence which bear closely on the problem of cruelty to animals, namely physiological and ethological, based in the first on the structure of the animal and the function of its parts; and in the second on its observed behaviour. When we come to interpretation we shall find that the two lines of evidence act and interact upon one another.

Let us take first the anatomical-physiological aspect. This will be considered under the headings of (i) pain and discomfort (ii) stress (including fright, anxiety, frustration, apprehension etc.).

(i) *Pain and discomfort*

The reactions of animals to the kinds of stimuli which cause pain or fear in ourselves are very often but not always very similar to our own, so that we immediately have a sympathetic feeling for the animal. There are three reactions of this kind: (*a*) a struggle to escape, (*b*) the contortion of parts of the body, especially the face, and (*c*) the production of sounds that are unusual in the ordinary course of life and are either loud or piercing or else appear to us to be mournful and full of foreboding. Since most of the animals that we are concerned with live in groups, they have special habits in relation to social life, and we find that young animals which are normally tended by their parents, often call attention to their sensation of pain in a way that is easily interpreted by us. In the same way a parent animal which has been separated from a young

one usually expresses its anxiety in a manner which we human beings cannot easily mistake.

As to the sensation of pain itself, there can be little doubt that all the animals with which the farmer is concerned have a pain sense at least similar in type if not in degree to that of man. All of them have the minute nerve endings widely distributed over the body which are particularly associated with pain perception and the fibres from which cross the spinal cord and ascend to the brain as a special tract (the spino-thalamic) which is distinct from the tract by which sensations of touch reach the brain. In all domestic animals the mechanism and the essential arrangement of the structures concerned is the same as in man. But there are differences in the relative sizes of the parts, and in many animals the thalamus is relatively larger and the cortex smaller than in man. This difference (as Baker, J. R. 1948 has shown) becomes progressively more noticeable as we descend towards the more primitive mammals and birds and especially when we reach the lower classes of vertebrates. This might mean that the animal is quite as well aware as we are of the existence of violent pain but is less capable of localising it in any special part of the body. The animal may thus be more likely to react with violent movements that may result from the functioning of the thalamus and less likely to take controlled and directed action to avoid the stimulus since the higher centres are smaller and presumably are in less effective control. We may sum up this section by quoting Baker as follows: "When we consider how closely similar the nervous systems of man and the higher animals are, in regard to the path followed by impulses originating in sites of injury, it is only reasonable to conclude that these animals are conscious of pain in the same sort of way that we are. *At any rate, no humane person can act on the assumption that they are not.*" (Italics mine.)

(ii) *Stress (including fright, anxiety, frustration, apprehension etc.)*

It was the fashion until recently for physiologists to ignore, more or less, the subject of stress and anxiety, since so little was known about them from the physiological angle that little useful could be said. In recent years, however, a great deal of knowledge has accumulated concerning the physiological effects of fright and anxiety in animals, particularly in the wild and the laboratory rat. Rats are highly social animals which can learn to know individually a large number of associates and if, under laboratory conditions, strangers are introduced they will almost invariably be attacked and some of them killed outright. However, many such interlopers die without being attacked and some, after being subjected to severe attack, die even though they may not appear to have been critically injured or even not injured at all. There is abundant evidence that death is due to shock following on fright, and that it is associated with the increased size of the adrenals, a lowering of liver glycogen and a great increase in the blood sugar content. Similar shock disease leading to death is well known in captive wild mammals and birds. As a result of captivity the animals exchange a life of sustained and violent activity for a placid and sometimes boring existence. Their adrenals regress to the point at which they are unable to sustain even minor disturbances such as being transferred to new quarters or disturbed by repairs to the cage. They show many of the physiological symptoms of the stressed rats just discussed and presumably their sufferings are in some respect similar to those of a human being under similar circumstances. There is no reason to suppose that domestic animals are essentially different from wild animals in these respects and the well known loss of condition in cattle resulting from a change of quarters is a probable example of it. But the process of domestication has no doubt led, in some cases at least, to a physiological adaptation which reduces the violence, and sometimes no doubt alters the form, of the response to disturbing conditions. Nevertheless, physio-

logical studies, as far as they have gone, give no ground whatever for believing that, whether in cattle, sheep, pigs or poultry, suffering due to stress and deprivation can be ignored; on the contrary it must be very much borne in mind in assessing what is permissible in agricultural practice.

The ethological aspect

A very large part of animal behaviour is basically determined by instinctive or innate abilities, proclivities and dispositions. Suppression of these instinctive appetites can give rise to evidences of prolonged and intense emotional disturbances which, whether or not they are painful to the animal, are most distressing to see. Three examples may be cited: (i) the night-long agitated flutterings of a migratory bird confined in a cage during migration time, (ii) the extreme emotional aggressiveness of animals isolated throughout life from their own species without opportunity to establish emotional attachments to man or another species. Such treatment may cause the animal to turn upon itself and so inflict self-injury—biting or tearing its own limbs, (iii) the compulsive rocking or pacing movements, often involving quite abnormal postures and actions, sometimes seen in zoos or circus animals long confined in cages which are too small. It is the recognition of such treatment as cruel that has led to the existing law in Great Britain prohibiting the keeping of birds in cages too small for them to be able to spread their wings.

Another aspect of animal behaviour is the ability to learn; to build upon, extend and adjust by experience, the innate patterns of behaviour; especially as the result of conditioning or other types of learning. By such means the animal can learn to perfect its hunting or escape techniques, learn its way about, how to find its way home when displaced, learn to recognise enemies and the dangers they imply and also to learn to recognise individually members of the same species, the same colony or the human beings which feed and tend it. In short, the animal can learn how to organise its life as a member of a group of associates. In regard to domestic and laboratory animals, this type of learning has its dangerous side; for the animal can learn to fear persons and places which have been associated with pain and injury (as for example the dread of a dog being taken to a veterinary surgery where it has once been hurt). This is of great importance in laboratory practice. But in the laboratory the development of fear and anxiety can be almost completely avoided if, for example, by skilful handling and the use of drugs the possibility of the animal realising cause and effect is prevented, so that he does not associate any pain he may suffer with any person who tends him or any of the regular daily or weekly treatments he receives. A sensitive animal or bird can be reduced to a pitiable nervous wreck by ill-treatment and unnecessary fright. But in most well run laboratories the animals will appear reasonably serene and contented—sometimes strikingly so. There is no basic reason why much of the suffering caused by the practices of animal husbandry could not be avoided in much the same way.

But there remains a great deal of frustration and stress resulting from the very nature of farming which cannot be avoided. Obviously domestic animals cannot be allowed to run entirely free, to breed at random, to rear their own young in the normal way of the wild, or to establish their own social groupings and hierarchies. Nor indeed if, having experience of both, they could be asked their opinion, is it probable that they would always prefer the wild. In the early part of 1964 a group of African buffalo were captured in a region of Kenya where their natural existence was no longer tolerable or possible, and were taken for release in the Nairobi National Park. They resented being captured, as any wild animal would. After capture, during the processes of transport and preparation for release, they were of course kept in pens or yards much like those in which domestic cattle are kept. When the time came for their

release in the new environment, they showed many signs of distaste for it. They would return towards human habitations at nightfall and try to enter the paddocks where they had been. One even tried to walk through the french windows of the office of the Director of the Kenya National Parks. The natural assumption is that the unfamiliar National Park, reeking of lion, leopard and other dangerous and uncomfortable neighbours, must have seemed a very unfriendly place; far inferior to the luxurious though restricted quarters they had become used to inhabiting! These buffalo could be "asked" because they had experienced both the wild and captive states. Domestic animals cannot usually be "asked" because they have never experienced the former; and animals, like men, doubtless prefer to keep the ills they have than fly to others that they know not of. But there is no doubt that a well managed farm or ranch run on approximately "natural" lines can provide an environment for animals which, on any estimate that we are able to make, must be in many ways preferable to the wild. At least farm animals are not subject to the dangers of predator attack or forest fire, they do not die of starvation or thirst, they are largely protected from the scourges of parasite attack and from innumerable painful and wasting diseases. All this is on the credit side. What then, we may ask, does it matter if, on the debit side, they are forced to endure much boredom and a few fleeting pains and frustrations? And anyway, are not domestic animals so stupid that the extent of their mental life can be ignored as irrelevant? The answer we may give to these questions obviously depends on the very difficult business of estimating the intensity and range of these experiences of animals and, that elusive quality, their "intelligence". Difficult as this may be, we must attempt it; but in doing so we shall certainly arrive at the wrong conclusions unless we take into consideration every relevant fact that biological studies have to offer. I think, therefore, the most useful contribution is to attempt to summarise this knowledge as it relates to the main groups of domestic animals.

Before attempting to deal with the different animals, there is one general observation which I wish to stress again. All the domestic animals which man farms are species which, in the wild, show a fairly highly organised social life, either in flock, family, clan or herd. This means that their mental and behavioural organisation is also potentially on a high level, far higher in fact than the ordinary man imagines. Even though a cow in a stall or a pig in a sty may appear stupid enough, this impression may be quite erroneous simply because we have never even begun to comprehend the social organisation of the wild ancestor which in turn, despite the effects of domestication, still undoubtedly determines the sensory abilities and level of feeling and perception of the animal.

In this brief survey I propose to start with the "lowest" and work upwards: hence I shall begin with the domestic fowl.

The domestic fowl

The domestic fowl in its many forms was no doubt derived mainly if not entirely from the Burmese Red Jungle Fowl (*Gallus gallus gallus*), a member of the pheasant family which abounds in the woods of northern India. The cock has a harem of females and there is evidently a fairly high degree of flock organisation. An intensive study of the behavioural development of the Burmese Red Jungle Fowl has recently been published (Kruijt, 1964) and publication of a similarly detailed study of the domestic fowl by Baeumer was completed in 1962. There appears to be no essential difference between the behavioural organisation of the wild ancestor and a modern breed such as the White Leghorn. The mother hen accepts strange chicks up to 2 to 5 days after hatching provided they are the same colour as her own, but after that time

repels or even kills strangers irrespective of their colour. Social order plays an important role in the life of chickens and begins to develop fairly early. Young chicks settle the pecking order by real fighting in which all members of a brood often simultaneously engage in single combat. A rather permanent social stratification results from age grouping, cocks being generally dominant over hens, but young cocks having to fight their way up by vanquishing every hen of the flock. Social rank order does not mean permanent aggression between the fellow members of a flock and an established place in a community is a very real need for the individual. Social grooming is frequent and may lead, under abnormal circumstances, to the bad habit of feather eating. Examples of what appears to be social aid have been described: if a chicken tries to swallow a long strand of grass the latter often gets stuck in its throat, in which case it is regularly removed by another chicken. The cock drives stray hens back to the flock and there are many interesting cases of learning and long-term memory and some very surprising examples which seem to show a highly complicated mental process by which human aid may be exploited to the great advantage of the individual. Once rights have been established, fights may still occur but they do not last long and do not end in a decision, but in the combatants parting in a peculiar manner, each "saving his face". The species has a great number of different innate sounds or groups of sounds, each with a definite meaning in the social organisation. Although the characteristics of these vocal expressions vary with races and individuals, they are sufficiently general to serve for effective communication between various types of chickens. Some sounds voice contact with the flock and aid in finding the members, some attract others to food which has just been found, some alert to possible danger from the ground and air as well as warning of such dangers by graduation of sound. Some sounds indicate general excitement, others guard against annoyance, and still others serve as communication within the rank order. There is also vocal interaction between the cock and hen while choosing the nesting place.

Social organisation is based primarily on recognition of the head features, shape, size and flexibility of the comb, and colour, especially strong colours and white. The memory feats of chickens are quite remarkable. Both breed recognition and individual recognition can be learnt simultaneously. Memory for individuals may last up to three weeks and may be exceedingly precise. There is evidence for a persistent peck order in a flock of 96 pullets. A hen can remember the features and furnishings of its pen after an absence of over 14 days but compared to many other animals, chickens have a rather poor performance in detour tests and this is partly the reason for the quite erroneously low estimates of their intelligence which most people have.

Social stress is caused by temperature extremes, deficiencies of food and water, disease, competition with flock mates and overcrowding. Such social stress will result in decrease in clutch length, triggering of the moult etc. Caging, of course, eliminates the peck order so that timid hens have a better chance to produce when in batteries. Evidence upon the effect of caging on egg production is still somewhat conflicting. However, the California Improvement Commission (1961) using 5,400 birds of 55 different stocks, showed higher egg production from floor birds than from caged birds. De-beaked birds peck at a higher rate and de-beaking does not alter aggressiveness. Thus it does not eliminate social tension but does not, on the other hand, seem to influence mating ability and fertility.

To sum up the situation very briefly, it may be safely said that certain elements of modern methods of poultry farming must result in extreme deprivation and a very great deal of conflict and tension in a highly social and quite intelligent animal as a result of the almost complete suppression of instinctive drives and

innate social organisation, and their associated powers of perception and memory.

We are much less concerned with other poultry, but a few comments are relevant. The behaviour of turkeys parallels that of chickens closely in a number of respects and what has been said above applies sufficiently well to guide us to assess similar situations resulting from turkey farming. Ducks are very similar in parent-young interactions, their ability to learn to recognise one another, and in their powers of vocal communication, which however have not been studied so thoroughly. When, however, the families break up there is not the same maintenance of social organisation, but there must be an extremely good memory—perhaps much better than in the domestic fowl. Added to this there is the very high intelligence associated with the migratory habit, recognition of landmarks, and flyways, and the ability to return to the breeding territory which makes the mallard appear far more "intelligent" than the ancestor of the domestic chicken. The domestic goose in the form most usually met with is derived from the Grey Lag Goose of Europe (*Anser anser*). In regard to social organisation, it is one of the most highly developed of all birds and far from being stupid, must be greatly superior in mental and perceptual powers to the domestic fowl.

The mammals

Most of the mammals that we are concerned with in this report are members of the Ungulata—pigs, sheep and cattle. Here again the same basic facts apply, namely that these are essentially animals with a relatively high degree of family and social organisation, and therefore equipped with quite advanced and distinctive behaviour patterns and drives, and a high—often remarkably high—ability to learn. It is a remarkable fact that although these animals have been domesticated for many centuries (in the case of the pig, since the Neolithic at least), very little change in basic behavioural equipment and capacity has resulted from man's selective breeding. There seems no doubt that, in the main, these creatures are still essentially what they were in the prehistoric wild. In fact the only features of their behaviour that one can point to with any degree of confidence as having been changed by domestication, is the greater adaptability the domestic form shows in their toleration of sudden and great changes in environment and the decrease in selectivity for mates which they often show. Domestic mammals will often endure with only minor physiological and psychological upset, a change of scene or introduction to an unfamiliar pen which would very likely result in death from shock if experienced by a wild animal in a zoo.

Swine. Feral swine live in herds of five to eight, usually under the leadership of a senior boar. They are markedly territorial, at any rate in some areas, and there is no reasonable doubt that the boar and presumably other members of the herd, can recognise their normal associates individually, and also the young piglets. Both wild and domesticated pigs show a number of characteristics which are relative to our problems. They are extremely curious and interested in their environment. They are clearly very sensitive to climatic changes and in winter tend to huddle together on their bellies to conserve body heat, and during hot weather lie down in the open on their sides, their snouts facing the wind. Moreover, they have a special means of temperature regulation, keeping the body surface cool and moist by wallowing. They choose definite territories for "resting", though this seems to decrease to some extent in laboratory-reared animals. They are normally diurnal, but in tropical or sub-tropical areas and in temperate climates during very hot weather, much of their activity takes place at night. When compared in intelligence tests with crows and laboratory rats, the animals being required to choose a particular one among a series of

food boxes, their scores indicated a far higher adaptive capacity than the other two species. The learning ability of pigs shows itself extremely early in life. Each piglet learns to recognise a particular teat which thereafter elicits the feeding response. This learning is by both sight and smell. Once the particular teat is recognised, the teat becomes the chief if not the only one, eliciting the feeding response. Consequently a teat order is formed when suckling. Not only do the piglets recognise the teats with certainty, they also recognise the other members of their litter by sight and smell. Moreover, they have a definite communication system associated with feeding, warning, location and alarm, based on a considerable series of vocalisations which have not yet been very fully studied. Pigs also, as every farmer knows, can quickly learn to recognise particular sounds as fore-runners of reward. Young piglets appear to get "imprinted" on the parent and to some extent on the litter-mates, in somewhat the same way as do young goslings and other precocial birds, but in the Ungulates this is probably based more on scent than on vision. Both young and adult pigs show a good deal of play behaviour, and it has been stated that a play object such as a chain or rubber hose in each pen will occupy the attention of the group so well that it will minimise destructive activities such as tail-biting. However, the relatively elaborate games which are found in some other ungulates and many other mammals do not seem to have been described in swine. Feeding in the wild seems to be selective and the behaviour concerned with it, particularly the care with which particular delicacies are sought out and procured, highly complex. The ability of pigs to find truffles is, of course, well known.

To sum up, the domestic pig seems to have been changed only in minor ways by the long process of domestication. The general temperament whether "lively" or "dull" is certainly to a considerable extent under the control of the breeder, as are some parts of the sexual behaviour. Otherwise the domestic pig seems to show almost all the needs, drives, abilities and intelligence of its wild ancestor.

Sheep. Sheep have been domesticated certainly since 4,000 BC, and possibly since 6,500 BC which is the earliest record for the association of domestic goats with man. The nearest existing wild animal to the supposed ancestor of the sheep is the Mouflon, and the Soay sheep is thought to be the oldest and most primitive of the domesticated breeds. Sheep and goats, both wild and domesticated, have all the behaviour patterns which we have been discussing, associated with a highly organised family and clan structure appropriate for ranging over wild and desolate country. In the Mouflon the mother knows her lambs individually by smell as early as the age of 12 hours and the lambs know their mother by sight from the third day on. Vocalisations play an important part in the organisation of the flock, and memory for odours appears to be extremely long-lasting. Rather surprisingly, sheep do not appear to be as capable as pigs of learning visual patterns, and their sight is more probably adapted for use in open country and for detecting danger a long way off, than it is for close recognition. From the point of view of play, which is one of the best guides to the general intelligence level of a species, and which until not very long ago was regarded as peculiar to man, (!) sheep rank very high—probably higher than any other ungulate. The elaborate "follow-my-leader" and "king-of-the-castle" games played by lambs are familiar to all. There is a large number of sound signals governing every aspect of the normal life, but these have not yet been investigated in detail.

To sum up, we can say that probably the sheep is the least affected by domestication of any of the ungulates.

Cattle. All the European breeds of domestic cattle appear to have come from the extinct *Bos primogenius* (the Aurochs) which finally became extinct in

the year 1627. Domestication was well advanced by 2,500 BC when there were already a number of distinct breeds in existence. Although the wild ancestor of the domestic cattle cannot now be studied, much can be learned of the life and organisation of the genus by studying cattle which have returned to the wild, as in the Camargue, supposedly primitive breeds such as the Chillingham cattle, and related species such as the European and American bison. All these sources of information point to cattle as being essentially a highly intelligent ungulate, surpassed in this respect only by the horse amongst domesticated animals. The ability of cattle for individual recognition is probably higher than that of any of the other animals we are concerned with, and in addition to all the faculties found in, say, the sheep, there must have been a high degree of organisation in the groups which made up the large herds which roamed the plains. Because of migratory movements, there was undoubtedly great capacity for learning the features of a familiar environment, characters of landscape and so forth, and for remembering these probably over very many years. Feeding behaviour is very complex, as a great many recent studies have shown, and the animals have a high degree of curiosity which enables them to learn what they need to know about their surroundings. The herd organisation led among other things to much mutual grooming, which is presumably another means of establishing individual recognition. Attachment between the calf and the mother is particularly strong and probably endures long after weaning. This recognition is based on olfactory, visual and auditory cues. Play is well developed in cattle and it has been much studied. It appears to be an innate entity in itself, with its own drive, emotion, " releasers " and goals. It is in fact an activity engaged in solely for the sake of the activity itself, and not for the end result. Well fed, healthy animals under good conditions play more often than sick and poorly fed ones, and more often during good weather than in cold, wet weather. Adults often play upon release after a long period of confinement, as those who have seen Swiss cows released in spring from their long sojourn in the winter byres will know. Calves tend to play shortly after feeding, in new (but not strange) terrain, and on gaining access to movable familiar objects (e.g. a swinging door, etc.). Common to all these situations is the idea of a *new, but not unfamiliar,* object or field.

As with other domestic animals, selective breeding has produced many changes in temperament and excitability, but there seems to be no evidence for a substantial change in any single innate behaviour pattern or instinctive need.

Conclusion

In the above I have tried to summarise as briefly as possible what appear to me some of the more important, and mainly recent, conclusions of physiology and ethology concerning the senses and the behaviour of domestic animals and their wild relatives. In arriving at our conclusion we try to bear in mind the fact that although pain, suffering and stress are certainly not identical in animals and men, there are sound reasons for believing that they are substantial in domestic animals, and there is no justification whatsoever for disregarding any of them. To come to the specifically behavioural side, it is clear that there is bound to be a great deal of restriction and frustration accompanying agricultural methods. Some of this can certainly be minimised by reducing wherever possible the element of apprehension and the repetition of pain, and by avoiding sudden and very drastic changes to conditions much worse than those previously experienced by the animal.

In all that I have said it must be borne in mind that stress is a very difficult word to use consistently. Stress in one sense is not wholly bad: there is probably an optimum level for stress for young animals as there is for young humans. It may be that for both too easy a time or too hard a time give rise to conflict

and strains. There is certainly a very real relation in human beings between having the right amount of stimulation of various kinds in infancy and achieving, in adult life, the best response to stressful situations. Presumably the characteristics of the stress response are subject to a certain amount of artificial selection in domesticated animals, as I have suggested, and the optimum for a domestic cow would be different from that for a wild buffalo.

In all this I must make it clear that while I am sure both studies of comparative physiology and of behaviour have yielded and are yielding some extremely important facts which we must not neglect, nevertheless we are often extraordinarily ignorant of just those things we want to know most. In fact quite a number of lines of special research would have to be undertaken over some years before we could get much further towards a fully scientific answer to many of our problems. What is required is to examine the incidence of those expressive movements which are known to be associated with damaging situations in order to assess whether animals brought up with a certain degree of deprivation "suffer" from deprivation and stress in adulthood. It is obvious that this would be a major experimental undertaking. But, in the meantime, we are on safe ground in concluding that conditions which lead to physical deformity and to highly abnormal nutritional physiology must be considered as cruel. With regard to deprivation, the problem is more difficult for we have to decide to draw a line at a point where there may be no clear distinction, only a degree of difference. But here again certain basic facts are clear enough to justify action. Whilst accepting the need for much restriction, we must draw the line at conditions which completely suppress all or nearly all the natural, instinctive urges and behaviour patterns characteristic of actions appropriate to the high degree of social organisation as found in the ancestral wild species and which have been little, if at all, bred out in the process of domestication. In particular, it is clearly cruel so to restrain an animal for a large part of its life that it cannot use any of its normal locomotory behaviour patterns.

As a conclusion, we may aptly quote a few sentences, already referred to in our report above, from a recent address of Lord Brain, in which he was discussing this very question, primarily from the physiological side. "I personally can see no reason for conceding mind to my fellow men and denying it to animals . . . Mental functions, rightly viewed, are but servants of the impulses and emotions by which we live, and these, the springs of life, are surely diencephalic in their neurological location. Since the diencephalon is well developed in animals and birds, I at least cannot doubt that the interests and activities of animals are correlated with awareness and feelings in the same way as my own, and which may be, for ought I know, just as vivid."

APPENDIX IV

Report of the Committee on Experiments on Animals
(Cmnd. 2641) 1965, paragraphs 179–182

The Statutory Concept of Pain

179. Many scientific witnesses suggested that the concept to be controlled by the Act should be expressly expanded from "pain" to comprise "any interference with or departure from the animal's normal state of health or well-being", and that this larger concept should be termed "discomfort" or "distress". Their argument ran as follows. If he is familiar with the animal concerned the practised observer can readily detect when it is "out of sorts" or "off colour" and take steps to discover and remedy the cause. This condition does not deserve to be called "pain"; it is of a lower order and more akin to feelings of displeasure aroused in man by non-physical stimuli; indeed, it may be produced in animals by environmental stimuli of an indirect kind. If prolonged, however, it may lead to pain, and even if it does not the sum total of suffering short of actual pain may far exceed that of animals in which severe pain is transient or terminated after a relatively short time.

180. Other witnesses reminded us that mental illness and neurosis are largely problems in modern civilisation and, drew attention to increasing interest in states of animal behaviour and psychological experiment designed to find forms of treatment for disordered states in human patients. They cited evidence that acute fear, chronic anxiety or artificially-produced conflict of motives or frustration could produce psychosomatic effects in animals such as gastric ulceration, and we saw for ourselves that animals exposed to environmental stimuli, such as loud noises or bright light, exhibit physical signs of discomfort. These witnesses told us that manipulation of environment was likely to be much more widely used as an experimental technique in future, and urged that any procedure *designed* to produce the equivalent of stress in man should be subject to statutory control.

181. Within the concept of "pain", therefore, it is desirable to provide for at least three states of suffering:

(*a*) discomfort (such as may be characterised by such negative signs as poor condition, torpor, diminished appetite);

(*b*) stress (i.e. a condition of tension or anxiety predictable or readily explicable from environmental causes whether distinct from or including physical causes);

(*c*) pain (recognisable by more positive signs such as struggling, screaming or squealing, convulsions, severe palpitation).

As already indicated (paragraph 88) Home Office practice has been to use a wide interpretation of "pain" to cover pain, distress, discomfort or disturbance of normal health; and we understand that it has not found much difficulty in extending this interpretation to psychological experiment. We found general support for Home Office practice but some conflict of view on how this should be provided for in the law.

182. Some witnesses argued that states of pain, discomfort and stress might often overlap depending upon the degree to which suffering in the animal is physical or mental or both, that it was impossible to detect different forms of suffering, and that the most convenient course was to label any suffering as "pain". Other witnesses argued that to qualify "pain" in the statute might throw doubt on the width of the interpretation to be placed on this term rather than extend it to all forms of suffering it was desirable to control. Some scientific as well as anti-vivisection bodies suggested that the word "pain" should be retained

throughout the Act because it was a more challenging reminder of the suffering inseparable from experiments; words like "discomfort" or "stress", it was argued, might be criticised as euphemistic or intentionally misleading. On the other hand, it was urged that the widest possible definition of suffering would give the widest possible protection to animals; and that the image of the Act should not depend on administrative interpretation if the intention could be explicitly stated in the law. Our own view is that, if the range of suffering to be subject to the Act can be more precisely defined than at present, there should be less risk of confusion about the principles on which selective controls are applied, and more assurances of attention to the animal. We are satisfied that it is realistic to identify the three forms of suffering mentioned in paragraph 181, and that these comprise the range of suffering which should be subject to the Act. We recommend, therefore, that the Act should be amended so as clearly to apply to any experimental procedure liable to cause pain, stress, or interference with, or departure from, an animal's normal condition of well-being. With this in mind we shall refer throughout this Report to "pain" only when we mean pain in the strict sense, i.e. an extreme sensation of suffering more acute than discomfort or stress.

APPENDIX V

Suffering of Animals

Report of the Committee on Cruelty to Wild Animals
(*Cmd.* 8266) 1951, *paragraphs* 36–42

36. We have mentioned the widely held view that animals suffer, both mentally and physically, in the same way as human beings. Many of the allegations of cruelty which have been made to us in evidence have been based on this premise, and we have therefore examined very carefully the evidence which we have received on this question. It is, of course, indirect evidence, for no human being can have direct knowledge of what an animal feels or of the degree to which it suffers pain.

Physical Suffering

37. As we understand it, pain is the sensation mediated by a distinct family of nerve fibres which have their own connections with the brain. Pain is not as is commonly believed, the consequence of over-stimulating the organs devoted to some other sort of sensation, and by surgical means the sensation of pain can in fact be abolished from areas in which feelings of touch, pressure, heat and cold have been allowed to persist.

38. Some mammals are known to have, and all may be presumed to have, the nervous apparatus which in human beings is known to mediate the sensation of pain, and this is acceptable evidence that mammals do indeed feel pain. Further, animals squeal, struggle, and give other "behavioural" evidence which is generally regarded as the accompaniment of painful feelings. Evidence of this second sort is, perhaps, less certain, because outward signs of pain are variable and may be absent and it is impossible to say whether, and in what sense, the cry of an animal is to be given the same weight as the cry of a human being. Nevertheless, we believe that the physiological, and more particularly the anatomical, evidence fully justifies and reinforces the commonsense belief that animals feel pain.

39. It might be suggested that the nerve-fibre systems of animals which are structurally analogous to the pain systems of human beings mediate some quite different sensation of a sort which is necessarily unknown to human beings. We do not, however, accept this suggestion. Pain is of the utmost biological value to animals because in general what is painful is also harmful, and consequently animals tend to avoid anything which gives them the sensation of pain. Pain is the "conditioning" stimulus which teaches an animal to avoid what is physically harmful to it, and this end could hardly be achieved unless the pain felt by animals was painful in the ordinary sense. Pain is therefore a sensation of clear-cut biological usefulness, and this fact may be accepted as a third type of evidence that animals feel pain.

40. We are satisfied, therefore, that animals suffer pain in the same way as human beings. Nevertheless, we think it may be a mistake to assume that the severity of the pain or the amount of suffering that is experienced varies in strict proportion to the severity of the wound. Some organs are insensitive to pain and severe injuries to them can be less painful than minor injuries to other organs. Conversely it is known that in human beings almost unremitting pain of the severest kind may be the consequence of injuries or abnormalities which are in a physical sense quite trivial. It is possible, furthermore, that under conditions of great physical excitement or stress animals may, like human beings, become temporarily insensitive to what would otherwise be acutely painful stimuli. Very detailed and confident statements about the degree of pain which animals suffer as a result of one sort of injury or another are therefore only too likely to be misleading.

Mental Suffering

41. Several witnesses have laid great stress on the fact that, in their opinion, animals suffer " mentally " when they are pursued or caught. It is, as we have already said, impossible for a human being to know exactly what an animal does feel, but a reliable indication can be obtained by comparing the symptoms exhibited by animals with those which are known to accompany mental suffering in human beings. Awareness of, and preparations for, danger are associated in man with a general stimulation of nervous and endocrine systems which leads to such familiar consequences as an increase in the rate and efficiency of the heart-beat, an increase in the rate and depth of breathing, rise of blood pressure, pallor and sweating. The complex of sensations that accompanies these activities is usually known as " alarm ", " acute fear ", or " terror ", according to its degree of severity. Animals show these signs of agitation and it is reasonable to suppose that they feel their sensory or mental accompaniments as well. It can, of course, be argued that fear and terror are purely mental activities superimposed upon the physical signs of terror and independent of the merely " physical " sensations that accompany them, but we do not think that this interpretation is plausible and are satisfied that animals do suffer from acute fear and terror.

42. We are not, however, satisfied that wild animals suffer from apprehension or the after-effects of fear to the same extent as human beings. Wild animals must live very largely in the present, and although a hunted fox, for example, may be aware that it is being hunted and that if the hounds catch it something to be avoided will happen, we think it would be going beyond the evidence to say that the fox realises that it may be killed. We have been told by several witnesses of hunted foxes stopping to kill a chicken, but the scientific explanation of this is still uncertain. We think therefore, that, while it is reasonable to assume that wild animals suffer from temporary fear and terror, there are no grounds for supposing that they suffer from apprehension to the same extent as human beings or that a frightening experience has the same serious or lasting effect upon them as it may have upon us.

APPENDIX VI

Note on Food Additives, Antibiotics and Oestrogens

(Provided by the Ministry of Agriculture, Fisheries and Food)

Antibiotics

1. Under powers given them by the Therapeutic Substances Act, 1956, the Health Ministers have made regulations which provide that certain antibiotics (including nearly all those in common use) may be obtained only on prescription. There is, however, an exception to this rule which makes it possible for farmers to obtain feedingstuffs for pigs and poultry containing antibiotics. This exception is confined to three specific antibiotics (penicillin, chlortetracycline and oxytetracyline) and applies only if the amount of the antibiotic incorporated in the feedingstuff does not exceed 100 grams per ton. A similar exception is made for antibiotic supplements which farmers can obtain for inclusion in feed they mix themselves. Any use of antibiotics in feedingstuffs outside the terms of these exceptions is possible only on a veterinary surgeon's prescription.

2. New regulations are currently the subject of consultation with interested bodies which would allow feedingstuffs for calves containing antibiotics to be obtained without prescription provided the antibiotic content did not exceed 50 grams per ton; reduce the maximum level for pig and poultry feedingstuffs also to 50 grams per ton; and replace the exception at present allowed for antibiotic supplements with one confined to the high-protein type of concentrate containing antibiotics.

Veterinary Products Safety Precautions Scheme

3. This voluntary scheme was drawn up following discussions between Government Departments and representatives of professional and commercial organisations. It covers all veterinary products, not subject to other controls such as those contained in the Therapeutic Substances Act, which are available directly to the farmer. Its purpose is to safeguard human beings (whether they be users, consumers of food substances from treated animals or poultry, or other members of the public), livestock, domestic animals and wildlife against risks arising from the use of veterinary products. Under the scheme distributors undertake to notify new products before they are introduced, and new uses of existing products; to provide information to enable Departments to advise on precautionary measures for their use; not to market new products until agreement on precautionary measures has been reached; to include agreed precautions on the label and to take measures to ensure that they are understood and observed.

Declaration of certain additives in animal feeding stuffs

4. The addition of minerals or drugs to prepared animal feeds is a commonly used method of preventing certain enzootic infections or conditions and obtaining favourable growth rates. In 1959 the trade associations representing most manufacturers of animal feedingstuffs introduced after discussion with Government Departments the Voluntary Scheme for the Declaration of Certain Additives in Feedingstuffs. The scheme includes coccidiostats, anti-blackhead drugs, synthetic hormones and copper and magnesium additives. Manufacturers participating in it agree to give certain information on the label of the feedingstuff, or on the invoice for bulk deliveries including the name of the feedingstuff and the type of stock for which it is intended, the short chemical name of the additive, the rate of inclusion at the time of manufacture and special instructions and cautions as to use.

5. Ministers have powers under the Fertilisers and Feedingstuffs Act 1926, to make regulations requiring sellers of feedingstuffs to make declarations as

to the presence and amounts of specified ingredients. Local authorities take samples and action can be taken against sellers if declarations are incorrect to the prejudice of the purchaser. The Standing Advisory Committee which advises Ministers of regulations made under the Act is at present considering the desirability and practicability of bringing the additives covered by the Voluntary Declaration Scheme within the scope of the Act. One of the practicable difficulties involved in requiring declarations of the amounts of additives present is that acceptable methods of analysis must be available to test the accuracy of such declarations.

6. Other voluntary arrangements have been agreed by the trade associations including a recommendation to members not to use arsenicals or thyroid stimulants in feeding stuffs.

Synthetic Oestrogens

7. Synthetic oestrogens are used to improve liveweight gain in cattle and sheep and to improve carcase quality in poultry. They are administered to poultry by implantation of a pellet at the base of the skull and to cattle by implantation in the ear; mixture with feeds is now rare. Their use is not widespread. Although no firm figures are available, it has been estimated that about 2–3 per cent. of beef cattle, a smaller proportion of sheep and about 10 per cent. of table poultry are treated in this way. Synthetic oestrogens are not used on broiler poultry. Except at the site of the implant only very slight traces of hormone are detectable in the flesh of treated poultry and no trace can be detected in the flesh of treated cattle. Government Departments in consultation with the Agricultural Research Council and the Medical Research Council keep watch on the use of these products in all its aspects including human and animal health.

Food and Drugs Act, 1955

8. General control of residues in food for human consumption is effected under the Food and Drugs Act, 1955, which provides inter alia that:

(*a*) no person shall add any substance to food so as to render it injurious to health;

(*b*) no person shall sell to the prejudice of the purchaser food which is not of the nature, quality of substance demanded of him;

(*c*) no person shall sell food intended for but unfit for human consumption.

These provisions are enforced by local foods and drugs authorities whose officers may take samples for analysis by the Public Analyst. Authorities may take proceedings against the seller of any food which contravenes the Act's provisions and may suspend the sale of food found to be unfit for human consumption.

Nutritive value and flavour

9. The Minister of Agriculture, Fisheries and Food has asked his Scientific Advisory Panel to consider whether intensive systems of production have any effect on the quality and taste of food and studies of the chemical composition of meat, eggs and poultry are being undertaken to this end.

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