REPORT ON PRIORITIES IN
ANIMAL WELFARE RESEARCH AND DEVELOPMENT

March 1988
PRIORITIES FOR RESEARCH AND DEVELOPMENT INTO ANIMAL WELFARE

BACKGROUND

1. The remit of the Farm Animal Welfare Council is to keep under review the welfare of farm animals on agricultural land, at markets, in transit and at the place of slaughter, and to advise Agriculture Ministers of any legislative or other changes which may be necessary.

2. The Council attaches prime importance to the acquisition of new knowledge relating to animal husbandry by research and development and seeks to encourage this wherever possible. Whilst the Council acknowledges that the Government has identified animal welfare as a priority area for public funding, it has been concerned to note the reduction in financial resources made available for agricultural research and development in recent years. It therefore considers it essential to establish a set of priority areas for future animal welfare and disease research to help ensure that all future funding is put to the best possible use.

3. The Farm Animal Welfare Council, through its Research and Development Group, reviews current and planned research into animal welfare and gives direct advice to the various species-based consultative committees who report to the priorities board on R & D in agriculture. The Council also publishes recommendations for research in its own reports, e.g. the Report on Welfare of Poultry at the time of Slaughter.

4. In October 1985 the Council's Research and Development Group sent a questionnaire to 40 of Great Britain's leading experts in animal research asking them to identify priorities. The replies received were considered carefully and formed the basis of a discussion workshop held in January 1987 between Council Members, Agriculture Departments, the Agriculture and Food Research Council and many of the experts who responded to the questionnaire.

5. The Council's list of priority areas is contained in the following paragraphs. The Council considers that it is vital that Agriculture Departments, the AFRC and other research bodies - both academic and industry funded - bear these recommendations in mind when drawing up future programmes of animal welfare (and disease) Research and Development.
INTRODUCTION

6. In drawing up a list of specific priorities for R & D relating to the welfare of the different farm species, the Council has identified and applied certain fundamental principles.

(i) Minimal standards for welfare require attention to all 'five freedoms,' namely freedom from (a) malnutrition (b) thermal & physical discomfort (c) injury and disease (d) fear and stress (e) severe restriction on behaviour

(ii) In many (but not all) cases, productivity and welfare are synonymous. Where this is so, the Council does not see it as its business to make special representation. Where there is conflict (eg battery eggs, white veal) this becomes our concern.

(iii) There is also a general tendency to equate freedom from injury and disease with optimal productivity and therefore to claim that this is adequately covered in the traditional, production related, R & D as sponsored by government and industry. Here, too, however there are exceptions. For example, the laying hen or breeding ewe can continue to achieve optimal production targets whilst crippled by lameness. Again we consider it our business to make special pleading for R & D designed to minimise pain and distress where it may not significantly improve efficiency of production.

(iv) We recognise the need to develop, through R & D, environments better suited to the behavioural needs of farm animals even in cases where they may reduce productive efficiency. It follows inevitably that such improved husbandry systems could not be achieved without appropriate legislation because of the financial penalties incurred by those attempting to introduce less productive systems.

(v) We recognise that some features of current or planned R & D could, if applied on commercial units, cause a deterioration in welfare standards (eg artificial rearing of piglets from birth). While it
is not our intention to discourage the acquisition of new knowledge from experiments conducted under proper control from the Home Office, we consider that the evaluation of research projects should include the question "Could this work, if applied in practice, be harmful to welfare?" If the answer to that question is "yes" then the project would only merit support if it also had a realistic expectation of positive benefits (eg artificial rearing of piglets from birth under experimental conditions might realistically be expected to lead to improved understanding of the acquisition of immune competence and thus ultimately lead to a reduction in neonatal mortality under more "natural conditions").

7. R & D into animal welfare is carried out to improve understanding based on objective assessment and scientific method and therefore the research recommendations from FAWC are based, as far as possible, on this approach. Nevertheless, when there is a free market for animal produce, consumer choice may influence husbandry systems for reasons that appear, scientifically, to be unrelated to human health or animal welfare (eg the ban on the use of anabolic steroids for beef cattle). It may be necessary from time to time to conduct R & D to evaluate possible positive and negative consequences for farm animal health and welfare of political responses to public demand. For example, phasing out of battery cages for laying hens (as proposed by the House of Commons Select Committee on Agriculture) could, in some circumstances, create more welfare problems than it resolved (eg if it led to the uptake of the Pennsylvania large cage system for laying hens).

General priorities applicable to all farm animals

1. HEALTH

Full health and vigour is fundamental to good welfare. Priorities for R & D in relation to animal disease appear in reports from the consultative committees for the various farm species to the Priorities Board for Research and Development in Agriculture and Food. The justification given by the Cattle Committee for R & D on disease was "efficient production of milk and meat, the cattle export trade, public health and animal welfare." Our remit is only to consider the need to reduce pain and suffering in farm animals. We give particular emphasis therefore to those conditions which may cause pain and suffering without reducing the efficiency of production.
General priorities are:

1.1 Epidemiological investigation into the effect of breeding, nutrition and management on the incidence, pathogenesis and severity of infectious and non-infectious disease.

High priority conditions include:
(i) Lameness and skeletal disorders in all farm animals.
(ii) Respiratory and enteric disease in young stock.

These diseases and disorders have high priority on welfare grounds because many have arisen as a direct consequence of the management system and are deemed to be an economically acceptable tax on intensification (e.g., skeletal and tendon disorders in broiler and laying chickens).

1.2 Assessment of disease implications of new husbandry systems designed primarily to improve welfare (e.g., effects of straw-based systems on respiratory disease).

1.3 Improved methods for the early recognition of diseases and disorders causing pain, malaise or chronic discomfort (e.g., skeletal disorders in poultry, metabolic disease and mastitis in cattle). This includes the development of biosensors for automating clinical testing (e.g., in the milking parlour).

1.4 Effect of emotional and physiological stresses on resistance to infectious and non-infectious disease.

2. Environment and Behaviour

Ideally, the environment for a farm animal should not only minimise discomfort, distress, fear and frustration but positively promote behavioural satisfaction. Realistic progress towards this ideal depends on an improved understanding of the animal's own perception of its environment. Analysis of an animal's behaviour in terms of external and internal motivating forces requires new research in physiology and ethology whose ultimate objective is to design environments more in tune with those patterns of behaviour which the animal itself deems important.

2.1 Physiological indices of welfare problems
(i) Determination of endocrine profiles in the peripheral blood of animals exposed to defined stresses. Measurements of concentrations of single hormones such as corticosteroids
are of limited use but profiles based on a range of hormones may reveal typical patterns for specific obvious stressors such as isolation or removal of young and these profiles may be used to evaluate other, less obvious stressors, eg related to transport or building design.

(ii) Measurement of neurochemical changes associated with stereotyped behaviour (eg bar chewing in sows) and the effects on such behaviour of drugs (eg naloxone) that modify neurobiology.

(iii) Telemetry of cardiovascular and other physiological responses from unrestrained animals to assess the response of animals to potentially stressful situations such as transportation.

2.2 Behavioural indices of welfare problems

(i) The use of operant conditioning and similar approaches to quantify the strength of motivation of animals to escape unpleasant situations (eg overcrowding) or seek desirable ones (eg a "comfortable" bed).

(ii) Study of the relationship between behavioural and physiological indices of welfare and of criteria for clinical recognition of distress using these indices.

(iii) Analysis of social behaviour in order to determine the optimal size and composition of populations of farm animals.

(iv) Systematic examination of the effect of existing and proposed husbandry systems on these ethological and physiological indices of welfare.

(v) Improved analysis of the interactions between livestock and stockmen.

(vi) The establishment (from the above) of behavioural criteria for the development of new husbandry systems.
3. ALTERNATIVE HUSBANDRY SYSTEMS

Public opinion and scientific evidence both point to clear deficiencies in many conventional husbandry systems, especially in regard to comfort and behaviour. It is relatively easy to devise alternative husbandry systems which appear to improve comfort and behaviour but it is essential to evaluate them systematically in terms of performance, productive efficiency and all five freedoms. The performance of laying fowls in different husbandry systems is being evaluated and other workers have investigated alternative husbandry systems for dry sows and veal calves. Considerable work has been done, particularly on lying areas and the quality of flooring and bedding. New knowledge of animal behaviour and new advances in technology (eg computer-controlled feeding stations) will continue to modify our perception of what is acceptable and possible in animal husbandry so there is a continuing need to test the implications of these things in practice. Experimental Husbandry Farms are excellent sites for evaluating alternative husbandry systems. It is unrealistic to expect such trials to be sponsored by the agricultural industry since most alternatives to existing intensive husbandry systems are not likely to yield economic benefits within existing law. These trials, however, demonstrate that certain aspects of conventional husbandry are unacceptable and avoidable. If so, they will need to be changed by regulation.

4. AVOIDANCE OF MUTILATIONS

Common mutilations performed for reasons of husbandry (rather than therapy) include castration, tail docking, disbudding/dehorning, debeaking and ear tagging/punching. The two obvious strategies for improving welfare are either to reduce the stress of the operation or dispense with it altogether.

4.1 It is necessary to conduct experiments (under licence) using physiological indices of pain and stress (eg corticosteroid concentrations) to determine the method and time of severe mutilations (eg castration) that give rise to the least intensity and duration of distress - ideally not outlasting the duration of action of any anaesthetic employed.

4.2 The possibility of developing humane alternatives to mutilations should be explored (eg chemical or immunological castration).
4.3 There is a continuing need to investigate the husbandry implications of no-mutilation policies, not simply to establish eg that chickens that have not been debeaked cause more damage to one another in a particular environment but to devise environments where such aberrant behaviour is negligible.

5. TRANSPORT

Transport removes animals from the environment to which they are accustomed and exposes them to a number of potential stressors which include handling, mixing, noise, vibration, thermal discomfort, denial of food and water and exposure to pathogens. Many of these problems are well recognised and we have drawn attention to them in our reports on markets and welfare at the time of slaughter. However, there is still a great need for R & D. Some work has been done, eg on thermal stresses in pigs and techniques for "harvesting" poultry but these preliminary studies, far from resolving the problem, have exposed the enormity of it. The following topics rate very high priority.

5.1 Analysis of effects of handling, mixing and the micro-environment experienced during transport on physiological and ethological indices of thermal and other stresses, fear and exhaustion — especially in poultry and pigs.

5.2 Improved techniques for harvesting and handling poultry.

6. SLAUGHTER

The problems of slaughter relate to the effectiveness of the stunning process itself and the stresses imposed on animals in the period immediately prior to stunning. Priorities for R & D therefore fall into two categories:

6.1 Fundamental physiological work to establish
(a) signs which indicate that an animal is completely insensible and
(b) to what extent reflex actions and movement post-stunning and sticking indicate awareness to pain.

6.2 Improved stunning methods.
(a) assessment of the effectiveness of various electrical stunning methods for inducing unconsciousness and avoiding recovery prior to death from exsanguination.
(b) gaseous stunning of poultry.
6.3 Improved pre-slaughter handling.
(a) development of handling procedures in the abattoir which exploit the natural behaviour of animals.

(b) improved methods for the mechanical handling of poultry prior to slaughter (eg shackling) to minimise stress and to ensure effective stunning.

(c) radical alternatives to conventional procedures for handling, transporting and killing animals designed to reduce or circumvent as many as possible of the insults to animals during the last day(s) of life.

SPECIFIC RECOMMENDATIONS BY SPECIES

7. CATTLE
High priority
1. Lameness, especially in dairy cattle.
2. Development of automated systems for milking and feeding on demand by the cow and early diagnosis of disease.
3. Respiratory disease, especially in young calves.
4. Evaluation of welfare-related problems arising from breeding or biotechnology, eg twinning, double muscling, Bovine Somatotropin and other exogenous hormones.

Moderate priority
1. Flooring and bedding material.
2. Religious slaughter methods acceptable to Jewish and Moslem communities and welfarists.
3. Physiological, ethological and immunological indices of poor welfare.
4. Problems associated with early marketing of calves.
5. Management and design of abattoirs and stunning and slaughter procedures.

8. SHEEP
High priority
1. Neonatal mortality in extensive and intensive units. This will include evaluation of behavioural aspects of the dam/offspring relationship, fostering and artificial rearing.
2. Problems associated with increased fecundity.
3. Stunning and slaughter procedures.
Moderate priority
1. Problems in loss and diseases of incisor and molar teeth.
2. Welfare problems associated with chemical or automatic shearing.
3. Avoidance of mutilation (castration and docking).
4. Lameness, including foot rot.

9. PIGS
   High priority
   1. Lameness in sows and piglets - biomechanics of injury and testing of flooring and bedding materials.
   2. Evaluation and amelioration of the motivational and environmental factors inducing boredom and abnormal behaviour patterns, particularly in dry sows.
   3. Design of alternative systems e.g. electronic feeding stalls for sows in groups, optimal housing for farrowing and lactating sows, family pen systems; analysis of stockmanship appropriate to each system.
   4. Stunning and killing procedures.

Moderate priority
1. Improved vehicle design.
2. Optimal weaning time for sows and piglets as assessed by all five freedoms.

10. POULTRY
    High priority
    1. Discovery of preferred environments and the extent of the motivation towards preferred environments in laying hens with the objective of developing a cage system more in tune with behavioural needs while retaining the production and hygiene advantages of existing cages.
    2. Evaluation and reduction of deaths, injuries and other stresses associated with the handling and transport of broilers and spent laying hens.
    3. Reduction of skeletal, muscular and tendon abnormalities in broilers and laying hens.
    4. Improved methods for stunning, slaughter and pre-slaughter handling.
    5. Improvements to the design of vehicles for transporting poultry.
Moderate priority
1. Further development of alternative systems for laying hens.
2. Assessment of pain and chronic discomfort resulting from debeaking and other mutilations.
3. Improvements to hygiene in poultry houses through improved control of ventilation and other methods for removing dusts and noxious gases.

OTHER SPECIES
11. MINK AND SILVER FOX
High priority
Appropriate housing systems
Better killing techniques

12. RABBITS
High priority
Appropriate housing systems

13. AREAS OF RESEARCH WHICH MIGHT, IN PRACTICE, LEAD TO POORER WELFARE
13.1 It should be obvious from this paper that FAWC wishes to encourage the acquisition of new knowledge relating to animal husbandry by research and development.
13.2 We further accept that scientific investigation aims to be impartial and without prejudice so that it is impossible to pronounce, a priori, whether any particular piece of new knowledge will reduce the frequency or extent of poor welfare. Nevertheless there are certain areas of R & D which could, if applied in practice, possibly lead to a significant deterioration in animal welfare.

These include:
(i) The manipulation of body size, shape or reproductive capacity by breeding, nutrition, hormone therapy or gene insertion in such a way as to reduce mobility, increase the risk of injury, metabolic diseases, skeletal or obstetric problems and perinatal mortality.
(ii) The use of sedative drugs to overcome deficiencies in existing or planned husbandry systems.
(iii) The use of potentially toxic or distressing drugs as an alternative to current husbandry practices (eg chemical shearing).
13.3 We would not wish to inhibit fundamental research in these areas. We would, however, insist that before any techniques arising from such research (eg insertion of genes - halothane, Boroola etc) were applied in practice, further R & D should be carried out with the separate objective of determining what welfare problems they posed (if any). We would also ask those bodies allocating funds for applied research in agriculture to consider the welfare implications of new approaches to the manipulation of animals or their environment when drawing up their own priorities for the allocation of limited funds.