Farm Animal Welfare Council

REPORT ON THE WELFARE OF LIVESTOCK (RED MEAT ANIMALS) AT THE TIME OF SLAUGHTER
## Contents

Chairman’s letter of submission to Agriculture Ministers

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To:

The Rt Hon Michael Jopling MP
Minister of Agriculture, Fisheries and Food
The Rt Hon George Younger TD MP
Secretary of State for Scotland
The Rt Hon Nicholas Edwards MP
Secretary of State for Wales

The Farm Animal Welfare Council decided in 1980 to undertake a comprehensive review of the welfare of livestock, including poultry, at the time of slaughter. The first stage of that review was completed in January 1982 with the publication of our report on the slaughter of poultry. The Council then embarked on the second and more extensive stage of the review covering the welfare of red meat animals. That work has now been completed and I have pleasure in submitting our report.

You will see that the report, which we propose to publish, contains a considerable number of findings and recommendations. These should not be interpreted as a general condemnation of those engaged in the difficult work of slaughtering livestock but rather as constructive proposals for ensuring that legislative provisions and those responsible for enforcement take proper account of the need for specific protection for livestock at slaughter and that the criteria for humane slaughter are clearly understood and practised by those engaged in the industry.

Our report, which is based on the views of the Council members whose backgrounds and interests cover a wide area, will we hope provide an independent and fair assessment which will be of interest, not only to those who already have a knowledge of the slaughter industry or a special interest in animal welfare, but also to the public at large who, for understandable reasons, often have limited and misleading impressions of the workings of slaughterhouses.

I very much hope that the necessary work involved in the consideration of our proposals and on consultations will be put in hand as quickly as possible and that it will lead to early legislative and other changes which will bring about the improvements which we believe to be in the interests of all.

We are already engaged on the third stage of our review, on the subject of religious slaughter practices, and I hope to be forwarding our report to you on this aspect within the next few months.

R J Harrison
Chairman – Farm Animal Welfare Council
Part I – Introduction and general comments

Introduction

1. An important feature of the Council’s work is its freedom to initiate enquiries of its own into any aspect of animal welfare within its terms of reference. The welfare of livestock at the time of slaughter was the first such enquiry undertaken by the Council and the first stage of this enquiry was completed with the submission to Agriculture Ministers of the Report on the Welfare of Poultry at the Time of Slaughter in January 1982. The Council has now completed the second stage of its slaughter review and this report on the Welfare of Red Meat Animals at the Time of Slaughter is now submitted to Agriculture Ministers for their consideration.

2. We have confined our review to the welfare of livestock from the time of arrival at the place of slaughter until death. Our remit therefore excluded transportation to the slaughterhouse and all slaughterhouse operations subsequent to the slaughter of the animal. Our report relates in the main to slaughterhouse premises (including lairages) but we have also taken account of on-farm slaughter and slaughter by knackers—particularly in relation to casualty slaughter. Species included in our review are cattle, sheep, pigs, horses, rabbits and goats. The specialised area of the slaughter of deer is being considered in the course of the Council’s current review of the welfare of farmed deer and is not therefore commented on in this report.

3. Our main slaughter enquiry includes the welfare aspects of religious methods of slaughter both in relation to poultry and to red meat animals. A Working Group of Council members has been given the task of investigating and reporting to the Council on this particular aspect of slaughter. A further report will be published on the findings and recommendations. Reference is not therefore made to the subject in this report.

4. In the initial stages of the enquiry, the Council publicised its proposed work and invited submissions on the subject both from organisations and members of the public. In response, submissions were received from some 25 organisations and from over 100 members of the public (see Appendix B).

5. During the course of the review, members of the Council visited 40 slaughterhouses in England, Scotland and Wales and in addition visited two
slaughterhouses in Holland and one in Denmark. This programme of visits provided the opportunity for seeing slaughter being undertaken in a wide variety of slaughter premises, ranging from large, modern, purpose-built slaughterhouses to small traditional butchers’ premises. It is accepted that only a small proportion of the total number of slaughterhouses in this country was seen and also that such pre-arranged visits may not in some cases have given members a fair representation of normal working conditions. However, most of the slaughterhouses selected for visits were chosen at random and were considered to have given members as realistic an impression of slaughtering activities as was possible.

6. We were aware in the course of our enquiry that the slaughter industry was suffering considerable economic problems. It was also evident that in some quarters commercial considerations were contributing to greater pressures on throughputs which in some cases were inconsistent with acceptable standards of welfare. Such a tendency is to be deplored and we would stress the need to ensure that commercial pressures do not cause welfare needs to be overlooked.

7. Nevertheless, bearing in mind the pressures on the industry, we should record our gratitude for the assistance received from slaughterhouse owners and managements in the course of our visits. Almost without exception they gave freely of their time and knowledge and did their best to ensure that we were given full demonstrations of their slaughter operation. We appreciated also the tolerance and good humour of slaughterhouse staff who were subjected to our scrutiny and intrusion on their time.

Findings and recommendations

8. The following sections in Part I of this Report relate to general issues. Our main conclusions and recommendations relating to each specific facility within the slaughterhouse and slaughter operation are recorded at Part II. A summary of recommendations is at Part III. A Glossary of Terms used, some of which may be unfamiliar to readers not engaged in the slaughter industry, is at Appendix C.

9. In addition to earmarking specific recommendations for legislative and other action, our report also contains comments and proposals on which legislative action is not appropriate but which are nevertheless important in the achievement of optimum welfare standards in the slaughter operation. We consider that such proposals should be formulated into guidelines in a Code of Practice.

Structure of the industry

10. During the period of our review, there were just over 1000 slaughterhouses operating in Great Britain. Of these only 24 were owned and operated by local authorities, the vast majority therefore being run by private companies. The total number of animals slaughtered during the year ending March 1983 were:
31 676 000 (comprising 3 162 000 cattle, 94 000 calves, 14 362 000 pigs and 14 058 000 sheep). Eighty-one slaughterhouses (known as 'export-approved slaughterhouses') are licensed for export of meat to other EC countries and these handle a considerable proportion of total slaughterings, i.e. approx 42 per cent of cattle, 36 per cent of sheep and 20 per cent of pigs.

11. There are little more than half the number of slaughterhouses operating now than there were in 1968/69 when over 2000 were recorded. Perhaps not surprisingly, the reduction in numbers has occurred almost entirely in slaughterhouses with lower throughputs and the concentration on larger units is evidenced by the fact that some 78 per cent of total slaughterings are now concentrated in 193 high-throughput slaughterhouses (i.e. those with annual throughputs of over 20 000 cattle units slaughtered).

12. These developments in the structure of the industry have obvious implications so far as the welfare of the animal is concerned. As small local slaughterhouses have disappeared, the distance animals have to be transported for slaughter has increased markedly, although changes in marketing patterns have also had a considerable influence on distances covered. The absence of local slaughter facilities has created particular problems for dealing with casualty animals and our concern in this area is detailed at Section 7 of the report. The concentration of slaughtering in large plants has other implications—biggest is not necessarily best when it comes to handling individual animals with care and concern, even though there may be benefits in the facilities and equipment available.

13. Many of the comments submitted to the Council at the beginning of this review (see para. 4) proposed that slaughter should be carried out as near to the farm of origin as possible. This is undoubtedly a commendable objective but the structure of the industry as it now exists means, in practice, that ‘as near as possible’ could be a considerable distance, particularly in remoter parts of the country. A further constraint is that it is not uncommon now for slaughterhouses to concentrate on a limited number of species, e.g. cattle and sheep. In the circumstances therefore it would be unrealistic for a recommendation to be made in this report that the distances covered by animals going for slaughter should be restricted to prescribed limits. Nevertheless we should record our concern that more account should be taken of the nearest available slaughtering facilities when the transportation of animals for slaughter is being planned. More livestock (particularly pigs) now go from the farm direct to the slaughterhouse rather than through markets. This is a trend which we favour and hope will develop further.

Existing legislation and enforcement

14. Primary legislation in England and Wales relating to the slaughter of red meat animals is contained in the Slaughterhouses Act 1974. Regulations specifically relating to the prevention of cruelty at slaughter are contained in
the Slaughter of Animals (Prevention of Cruelty) Regulations 1958. Other legislation which we have also taken into account in the course of our review which has some bearing on the issues involved is contained in:

- The Protection of Animals Act 1911
- The Slaughter of Pigs (Anaesthesia) Regulations 1958
- The Agriculture (Miscellaneous Provisions) Act 1968
- The Transit of Animals (Road and Rail) Order 1975
- The Slaughterhouses (Hygiene) Regulations 1977

Equivalent Scottish legislation is:

- The Protection of Animals (Scotland) Act 1912
- The Slaughter of Animals (Prevention of Cruelty) (Scotland) Regulations 1955
- The Food (Meat Inspection) (Scotland) Regulations 1961
- The Slaughter of Animals (Stunning Pens) (Scotland) Regulations 1963
- The Slaughterhouse Hygiene (Scotland) Regulations 1978
- The Slaughter of Animals (Scotland) Act 1980

Scottish provisions differ in several respects from those for England and Wales and we have endeavoured to identify those areas where there are marked differences. Where there is little difference in the basic provisions, references quoted in this report are generally taken from England and Wales legislation but it should be borne in mind that there would be an equivalent Scottish reference. Account has also been taken of the provisions of the European Convention for the Protection of Animals for Slaughter.

15. Enforcement of all the relevant slaughterhouse legislation is the responsibility of the lower tier local authority, i.e. at district level. Within the local authority that responsibility is usually delegated to the Environmental Health Officer and his meat inspection team based in the slaughterhouse. In addition, in export-approved slaughterhouses, i.e. those approved as complying with requirements for the export of fresh red meat to other EC countries (see para. 10), local authorities are required to appoint official veterinary surgeons (OVS) to supervise the requirements of the Fresh Meat Export (Hygiene and Inspection) Regulations 1981. This means that in the 81 export-approved slaughterhouses in Great Britain, there is a veterinary presence. All Scottish slaughterhouses, whether or not export-approved, have a veterinary presence through the veterinary meat inspection arrangements. In the non export-approved red meat slaughterhouses in England and Wales, there is no requirement for veterinary supervision. We understand that veterinary officers of the State Veterinary Service (SVS) maintain close contact with all slaughterhouses in their area. Although their role in relation to the welfare of animals at slaughter is generally considered to be on an advisory basis only, they do have powers of entry under current legislation and do make regular visits to export-approved slaughterhouses (monthly) and all other slaughterhouses and knackers' yards (every six months). One purpose of these visits is to check and report on the level of compliance with relevant legislation (including the welfare requirements). Deficiencies in standards are drawn to the attention of the local authority concerned and confirmed in writing.
16. Throughout our report we have made frequent references to situations where, though existing welfare legislation is considered to be adequate, enforcement is not. We consider that in many cases local authorities are not taking their responsibilities seriously enough, nor is it clear where overall responsibility lies within their organisation. We appreciate that local authorities have many competing demands on their resources and time, but nevertheless, we consider that they must be reminded of their responsibilities in this area, and they must be clear what those responsibilities are. They should be required to ensure that for every slaughterhouse within their district there is a responsible official who is designated as having responsibility for the application of the welfare legislation provisions in that slaughterhouse.

17. In export-approved slaughterhouses (in England, Scotland and Wales) we propose that the OVS would be the most appropriate officer to whom this responsibility should be allocated. The situation is less straightforward in slaughterhouses where there is no OVS presence. In such circumstances we suggest that a local Environmental Health Officer should be the responsible official and in Scotland, a Veterinary Meat Inspector. Such designated officers should be given formal responsibility for the supervision of the livestock welfare requirements in all parts of the slaughterhouse concerned, should be required to report any breaches of welfare regulations to the Chief Environmental Health Officer (Director of Environmental Health in Scotland) and copy their reports to the State Veterinary Service. Moreover, they should be allowed sufficient time in the course of their normal duties to carry out these welfare responsibilities.

18. We also recommend that the visiting and reporting arrangements undertaken by local officers of the SVS (reported at para. 15) should be formalised and that such visits to slaughterhouses where there is no OVS presence should be at more frequent intervals than the present six months. SVS officers should therefore be required to make visits to check on compliance with welfare requirements in all slaughterhouses, (a) at least once in every four months and, (b) to continue to copy the reports of their findings on each such visit to the Chief Environmental Health Officer, with any deficiencies clearly identified.

19. We appreciate that the mere identification of deficiencies is not of any value unless action is taken to put them right. We cannot stress too strongly the need for local authorities to use their powers in taking enforcement action when deficiencies which have been drawn to their attention are not put right. We understand that Agriculture Departments have powers to take prosecutions in the absence of the local authority taking legal action to enforce the slaughterhouse legislation. If local authorities do not make full use of their enforcement powers, the Agriculture Departments should be prepared to use their powers.

20. In addition to our recommendations for the designation of a local authority representative with responsibility for welfare, we have also recommended in this report (see para. 204) that a member of the slaughterhouse staff should be given clear responsibility for the supervision of animal
welfare. By such provisions we hope that the present tendency for welfare needs to be given a low priority will be overcome and areas of responsibility clearly defined.

Research and development

21. It has become evident in the course of our enquiry that much research work remains to be done to provide specific information on matters where current thinking is based only on subjective and often anthropomorphic considerations. Our programme of visits has included the Meat Research Institute (MRI) at Langford and also the equivalent Danish Institute at Ringsted. We are aware therefore that much work has been and is being done in many welfare-related areas, e.g. the effect of pre-slaughter stress on meat quality, the effects of high voltage stunning and the use of CO₂ stunning in pigs. We have commented in the course of our report on specific areas where we consider research should be undertaken, e.g. on assessment of unconsciousness (see para. 89), and we hope that a high degree of priority can be given to the allocation of funds for such work to be undertaken.

Stress

22. ‘Stress’ is a vague and often emotive term which can mean different things to different people. For the purposes of our review we define it as ‘any adverse effect on the well-being of the animal resulting from a hostile or potentially hostile environmental factor’. It is a fair assumption that the slaughter of any animal cannot be considered as a pleasant act. Whilst accepting that the slaughter of animals happens and will continue to do so, our aim in this review has been to ensure that everything possible should be done so that the slaughter operation is carried out in a way which causes the least possible stress to the animal. It is inevitable that transportation to a slaughterhouse, often involving long journeys with deprivation of food and water, temporary housing in a strange environment and subsequent handling and restraining prior to slaughter will impose considerable stress on all animals. Our aim is to minimise this stress to the extent that should be practicable allowing for the fact that the slaughterhouse exists to slaughter animals and operates under the constraints of economic pressures and human frailties. Nevertheless, the design of slaughter premises and the organisation, management and operation of the slaughter process are all critical factors in minimising this stress as are such human factors as the response of slaughterhouse staff to the welfare needs of the animals in their charge.

Licensing and design of slaughterhouses

23. In many cases in the course of visits to slaughterhouses it was evident that welfare problems arise when there are inherent faults in the basic design of the
premises. It was of considerable concern that such faults were often to be found in modern, purpose-built premises and it seemed evident that insufficient care had been taken at the design and planning stage. There were such problems as insufficient space on the slaughter line to cope with the throughput for which the premises had been intended, thereby creating holdups and stressful delays for animals waiting in the stunning areas; other problems encountered were inadequate ventilation and drinking facilities and slippery floors. Often little account appeared to have been taken of the welfare needs and behaviour of the animal and of the need for an acceptable working environment for the operators. It is evident that more care needs to be taken in the formulation and acceptance of plans for new or modernised slaughter premises. We do recognise, however, that welfare problems may not be apparent at the design and construction stage and may only emerge as a problem once the operation has got under way. Nevertheless we feel there is scope for more lessons to be learned from past mistakes and for a better awareness of potential problem areas.

24. Local authorities have a heavy statutory involvement in slaughterhouse design and construction in a variety of ways, ranging from initial planning consent through to the final licensing of a completed slaughterhouse. There is no statutory obligation for veterinary involvement at any stage in this development and licensing process (with the exception of slaughterhouses for EC export approval where the SVS are required to give formal approval, mainly on hygiene and meat inspection grounds). The demand for veterinary involvement at the planning and design stage, in relation to welfare considerations, therefore appears to be minimal. A specialist design and consultancy service for the meat industry is provided by the Meat Plant Advisory Service of the Meat and Livestock Commission (MLC) and, in addition, there are a number of private design consultants, including the major manufacturers of abattoir equipment, who are often willing to provide such a service. The extent to which welfare considerations are taken into account in such services has not been established but we doubt it is an area of sufficient priority.

25. Responsibility for the licensing of slaughterhouses and knackers' yards rests with the local authorities (under the provisions of Part I of the Slaughterhouses Act 1974). In granting such licences the welfare considerations that have to be taken into account are largely those prescribed in the Slaughter of Animals (Prevention of Cruelty) Regulations 1958. Licences can remain in force for a period not exceeding 13 months. In Scotland, there are no equivalent annual licensing provisions; private slaughterhouses are required to be registered with the local authority but the registration is for an indefinite period. Knackers' yards in Scotland are, however, subject to annual licensing.

26. We believe that welfare needs are not adequately taken into account in the granting of licences/registrations and that veterinary involvement is necessary to safeguard these considerations. We recommend that Scottish legislation be amended to require annual licensing (as opposed to mere registration) of all slaughter premises. We further recommend that where licences are being sought either for new premises, or for existing slaughterhouses which have significantly altered the lairage and/or slaughter facilities, the local authority
should be obliged to consult with the SVS for advice (to be confirmed in a written report copied to the Chief Environmental Health Officer) on compliance with the welfare provisions in relation to the slaughterhouse premises concerned. The local authority should retain responsibility for deciding whether or not a licence should be issued but in taking that decision should be required to take account of the SVS report. We further recommend that in considering straight renewals of licences, local authorities be required to take into account reports submitted by the SVS to the Chief Environmental Health Officer during the validity of the previous licence (see para. 18).

27. We stress the need for slaughterhouse managements to include in their capital plans expenditure on welfare improvements in addition to technical improvements. All too often it appeared that investment in slaughterhouse improvements had been geared solely to increasing throughput and profitability.
Part II – Comments and recommendations on specific aspects

SECTION 1

Unloading

28. Previous handling in the course of transfer from farm to slaughterhouse and the journey itself will already have created stress and the aim should be to off-load animals in a calm and unhurried manner into a calm and acceptable environment, thereby avoiding their being in an unsettled and excitable state when subsequently handled for slaughter.

29. Our remit did not include transportation to the slaughterhouse; such matters as the design of transport, length and duration of journey and all stages between dispatch from the farm and arrival at the slaughterhouse are not therefore dealt with in this report although we are aware that such factors can be critical to the state of the animal being presented for slaughter.

30. Most animals arrive at the slaughterhouse in cattle transporters although some, particularly those coming direct from the farm, are delivered in horse-boxes, farm trucks, etc. Many slaughterhouses have no purpose-built unloading ramps in which case off-loading has to be to ground level, usually directly into the lairage. Animals are generally averse to steep downward ramps and dislike being faced immediately with a dark access into the lairage building. They will often be unsteady on their feet at the end of a journey and the steepness of ramps and the effectiveness of non-slip surfaces will be important factors. Unloading problems are particularly bad with double-deck and multi-tier lorries. Hydraulic tail-lifts and even hydraulically operated adjustable unloading bays have been seen as normal practice in other European countries and we recommend that their use be encouraged here. The provisions of the Transit of Animals (Road and Rail) Order 1975 should provide adequate protection on such matters as the steepness of unloading ramps, the provision of side railings to prevent falling from ramps, and the construction of vehicle floors and ramp surfaces in such a way as to prevent slipping. We are not satisfied that this legislation is being properly enforced and recommend that local authorities should be reminded of their responsibilities in this area.

31. We were concerned to find that purpose-built unloading bays with ramps which permit off-loading either at lorry level or at a very slight gradient were
not more widely available. We recommend that the provision of such bays should be required by law when new premises are being constructed. They should be designed to allow animals a clear, unrestricted path in front of them into the lairage, have adequate but not bright light and include lateral fencing to ensure that animals cannot escape from lorry tailboards or fall off the ramp. More account should be taken of the provisions of Regulation 11 of the Slaughterhouses (Hygiene) Regulations 1977 which require non-slip surfaces and floors to be in good repair.

32. In the course of our visits we did not see animals being held for long periods in lorries awaiting off-loading at slaughterhouses. However, with the trend to higher throughput levels, we are aware that a hold-up at any stage on the slaughter line can easily work back to create a waiting problem in the unloading bay. The Transit of Animals (Road and Rail) Order 1975 contains relevant provisions to prevent unnecessary suffering or injury to animals held on the transporter and care should be taken to ensure that these provisions are observed for animals awaiting off-loading at slaughterhouses, particularly in so far as they relate to protection from extremes of weather, provision of adequate ventilation and of feeding and watering facilities.

33. We are aware that unnecessary stress and suffering are caused by driving sick or injured animals off transporters. The question of casualty slaughter is dealt with later in the report (see Section 7) but care must be taken to ensure that before unloading, any sick or injured animal is identified; and any such animal which is not capable of walking without causing it unnecessary pain or suffering should either be slaughtered on the transporter or, if feasible, carried from it.

Although we accept that in many cases animals cannot be restrained from moving off with the rest of their group in no circumstances should such animals be forced off the transporter with the remainder of the load.

34. We have been concerned at the excessive use of electric goads in some slaughterhouses, both in the unloading process and in the driving of animals, particularly pigs, into the stunning area. In many cases the use of an electric goad was counter-productive, creating confusion and stress for the animals. It was clear that in the hands of some slaughterhouse staff, use of the electric goad became an automatic act in the process of their handling of all animals, regardless of whether or not the animals were refusing to move forward. In most instances, if time is allowed for the first two or three animals to move forward voluntarily, then others will follow without trouble. We recommend the use of guide boards for pigs and would like to see more use made of the ‘rattle’ types of persuader which are used in other countries. We accept that for a limited number of animals, use of an electric goad or of a blunt stick, used entirely as an extension of the arm and not as a weapon, may be necessary. This use should, however, be limited to animals refusing to move forward and then to the hindquarters only; we have seen too many cases of random application of electric goads to the head and shoulders and instances of stick abuse to the anal or genital areas of the animal. Here again the current transit legislation contains provisions which should provide adequate
protection; Section 4(2)(a) of the 1975 Order requires that animals being unloaded shall not be caused injury or unnecessary suffering by reason of the excessive use of any instrument or thing used for driving the animal. We are not convinced however that it is being properly enforced (see also para. 66).

35. We should record that we have seen many instances of experienced, able stockmen handling livestock with understanding and kindness which have had obvious benefits in creating a relatively calm and unhurried atmosphere for the animals. In our view it is essential that slaughterhouses should have an experienced and able stockman responsible for handling livestock in the unloading and lairage areas. This should be reflected in the proposed Code of Practice.

36. We are aware that much research work has been done on the effects of pre-slaughter stress on the quality of meat. There is a clear indication, particularly for pigs, that stress in the run-up period to slaughter can affect the rate and extent of post-mortem acidity (pH value) of meat which can produce such adverse material as pale, soft, exudative meat in pigs or dark cutting meat in cattle. Therefore, the creation of such stress is doubly undesirable and needs to be minimised.

SECTION 2

Lairages

37. It is normal practice for animals to be housed for a period in the slaughterhouse lairage prior to slaughter. For operational reasons alone this is generally considered to be a necessity to allow for some degree of control of the flow of animals on to the slaughter line and to cover the potential problems of holding livestock when there are delays in the slaughter operation. The general view within the industry is that it is also in the interests of the animals’ welfare to be allowed a settling down period to overcome the stress of transportation. We have considered the question of whether it really is in the animals’ best interest to be given a resting period between arrival at the slaughterhouse and slaughter. It is argued that less stress overall is created by passing the animal on for slaughter immediately it is off-loaded from the transporter, on the basis that the animal is already stressed and is unlikely to obtain much benefit from spending a short period in a strange and often noisy lairage environment prior to facing a yet more stressful situation in the stunning and slaughter area.

38. On balance, we have concluded that there is insufficient evidence to justify a positive recommendation that animals either should or should not be laired prior to slaughter. We were also conscious that a recommendation to exclude lairing could create further problems, e.g. animals being left waiting on lorries for long periods and unloading being rushed to ensure the continuous running of the slaughter line.
39. If animals are to be laired, then it must be properly done to the extent that the time spent in the lairage should be long enough to allow them to settle down and the accommodation must be such that stress is kept to a minimum.

40. The Slaughter of Animals (Prevention of Cruelty) Regulations 1958 contain general requirements relating to the provision and design of lairages. These Regulations include such provisions as the need for the accommodation to be of adequate size and construction for the number of animals contained, shelter from sun and adverse weather, provision of adequate drinking troughs and feeding racks, adequate ventilation and lights, bedding for animals kept overnight and separation of horned and fractious animals. Whilst we are reasonably satisfied that these Regulations do provide for acceptable standards of lairing, we are not satisfied that they are being adequately enforced. We have also concluded that in some respects there is need for more specific regulations.

41. It is reasonable to assume that the conditions in lairages at the time of our pre-arranged visits would have been at or above normal operating standards. In many cases it seemed evident that generous quantities of fresh straw had been provided in the pens to coincide with our arrival. Current legislation does not require bedding to be provided unless animals are held overnight. It is common practice therefore in many slaughterhouses for no bedding to be provided during the course of the day and, in some where livestock were known to be housed overnight on occasions, there was no evidence of bedding being available to cover the eventuality of an overnight stay.

42. We have considered whether there should be a requirement for bedding to be provided during the day, or for specific categories of livestock, e.g. calves. Although in our view it would be desirable to have clean straw bedding in every pen, we realise that it would be unrealistic to make such a provision mandatory although we commend the practice. We appreciate, however, the problems which can arise from regular renewal of bedding and the potential health and hygiene risks of soiled bedding. We have also seen purpose-made slatted and mesh floors. Slats should be so constructed as to facilitate ease of lifting and replacing. They need to be properly cleansed and must be well maintained so that there are no gaps in which the animals’ feet can be caught.

43. The 1958 Regulations, although specifying that the lairage should be adequate in size and construction for the number of animals laired therein, do not set any space standards. In the course of our visits we have seen some overcrowding in lairage pens, particularly with pigs.

44. Pigs are more prone to lairing problems than other species. They are inclined to panic if overcrowded and if one social group is mixed with another in one pen there is a real risk of fighting for ascendency; considerable physical damage as well as stress can be caused. Other animals in the lairage may become unsettled as a result of the fighting.

45. We have considered recommending specific space standards for each species within a lairage but have concluded that this would be impracticable with so many variables, e.g. in sizes within species, optimum group sizes,
multi-purpose pens, etc. Therefore to overcome the risk of overcrowding we recommend that there should be a general requirement that each animal housed in a lairage must have sufficient space to stand up, lie down, and to turn around.

46. The standard of construction of lairage pens we have seen is variable. We have seen considerable contrasts, particularly in the age of the buildings used and in the capacity, ranging from single loose-box housing on butchers’ private premises, through to purpose-built housing for 2000 pigs in a Danish bacon factory. We have seen pens constructed with solid concrete walls, metal walls, and with post and rail fencing. We appreciate that cost is a factor here, particularly in relation to construction and ease of cleaning, but solid walls do, in our view, appear to have advantages for the welfare of the animal in such areas as freedom from draught, less noise and more security; pigs in particular like to lie against a solid wall. Another design factor which has advantages is the use of long narrow pens which allow most of the animals penned to have the benefit of the security of close contact with the walls. The incorporation in such a design of an end wall or gate which can be pushed forward on runners down through the pen to move the animals calmly out of the pen has much to commend it.

47. Ventilation is an important factor in lairages and we have seen varying standards. In enclosed buildings there is a need to ensure adequate exchange of air. In many cases we have been aware of high ammonia levels, especially where sheep and pigs are housed, and this can be particularly unpleasant. We have seen lairages which contain air conditioning facilities and, provided these are kept in good working order, they are obviously desirable.

48. Many lairages contain water sprinkling devices with the object of cooling down and settling pigs. These appear to work well although care needs to be taken that the sprinklers are properly maintained and eject only a fine spray, not a jet of water. With such systems care also needs to be taken to ensure that air temperatures are maintained at a level which avoids the creation of an unpleasant steamy atmosphere (see also para. 63).

49. Lighting levels are important. As has been mentioned previously, animals should not be driven from a bright light (either natural or artificial) into a dark area. We have found no clear evidence that housed animals settle down better either in darker or lighter premises but obviously lighting must be sufficient to allow proper inspection of the animals.

50. Legislation requires that wholesome water shall be available throughout the time the animal is held in the lairage. In the course of our visits water supplies within the pens were generally found to be adequate but on occasions there was some evidence of water troughs being badly positioned and not maintained in good working order. In some instances we saw continuous pipe systems in which plugs were missing causing flooding in some pens and lack of water in others. Drinking facilities should be subject to more regular checks by local authorities as the enforcing authority. It is important to ensure that water troughs and bowls are available at the correct height for the animals being housed – this is particularly relevant where pens are used for more than one
species. It is also important to ensure that animals which cannot cope with the drinking facility provided, e.g. nipple drinkers, are identified and an alternative source of water provided.

51. In addition we recommend that more research work be undertaken for all species to determine what are the best feeding practices prior to slaughter, with equal priority being given to the animals' welfare as well as to the handling and quality of the carcase. The major question of the provision or deprivation of food prior to slaughter is an area where insufficient evidence yet exists to enable us to make positive recommendations. Existing legislation provides for animals to be fed when they are housed in a lairage for more than 12 hours. The regulation containing this provision (Regulation 7) of the Slaughter of Animals (Prevention of Cruelty) Regulations 1958 is complicated in the extreme, often ignored and needs simplification.

52. Our concern is not however restricted to ensuring that animals retained for more than 12 hours are fed. We are aware that many animals coming into an abattoir may well have travelled for lengthy periods and been held for additional periods in markets prior to that. They may therefore have been without food for very much longer than 12 hours. We are particularly concerned at the effect this has on young calves. We accept that in some instances, particularly for pigs, a full feed shortly before transportation can be fatal, although a light feed can be advantageous. We also recognise that there are problems for the slaughterhouse operation if animals are fed immediately prior to slaughter. The timing of feeding is therefore critical but the welfare of the animal should be given more priority than it appears to have in this area at present. We appreciate the difficulties in tracing previous feeding times in the course of a chain of marketing and transportation links and reluctantly accept that any general provision made to ensure that an animal deprived of food for a prescribed period must be fed in the lairage is likely to be difficult to enforce. However, we are concerned that provision must be made to improve matters and recommend that in addition to amending Regulation 7 (see para. 51), consideration should also be given to including in the proposed Code of Practice a table which prescribes time limits within which food must be provided, which takes account not only of time spent in the lairage but also time spent on the journey to the slaughterhouse, the species concerned and the period to be allowed for between final feeding and slaughter. In any event animals kept overnight in the lairage must be provided with food.

53. Where animals are fed in lairages, it is important that the quantity and quality of food given should be adequate. We have seen stocks of food held in lairages which were not of good quality, e.g. mouldy fodder. Care should be taken to ensure that the existing requirement for 'suitable' food (Regulation 7(1) of the 1958 Regulations) is complied with, likewise the equivalent Scottish requirement for 'wholesome' food (Regulation 5(b) of the 1955 Regulations). A sufficient number of feeding racks and mangers, either fixed or portable, must be provided to ensure that all animals needing to be fed have access to food.
54. Except as previously mentioned in relation to the need to retain pigs within their social groupings, we have not been aware of particular problems with segregation of animals in lairages. We have seen instances where a group of horned cattle have not been restrained (Regulation 10(b) of the 1958 Regulations in fact requires restraint where two or more horned cattle are kept together) but we are not convinced that this necessarily creates problems and suggest that this regulation should be reviewed on the basis that there is more risk of stress from restraint than from damage from horns in a loose-housed horned group.

55. We have been encouraged to find that the main provisions of the 1958 Regulations apply to field lairages as well as to enclosed premises. An additional provision (at Regulation 11) is that animals shall not be laired in a field if the weather or the condition of the field is likely to cause suffering. We understand that animals laired away from the main slaughterhouse curtilage, on agricultural land, either in the open or in a building, also have the protection of the provisions of the Agriculture (Miscellaneous Provisions) Act 1968 and recommend that enforcing authorities should be reminded of that fact and of the need to ensure that surveillance of animals awaiting slaughter should not be restricted to those housed within the slaughterhouse premises.

SECTION 3

Handling from lairage to stunning area

56. Once the animal is moved out of its lairage pen to be taken for slaughter, the aim must be to allow it unimpeded movement forward in a calm, unhurried atmosphere and with the risk of physical damage and stress being kept to a minimum. We have seen varying standards and would again emphasise that the efficiency of the slaughterhouse staff in handling animals in a calm and understanding way is a vital contributory factor.

57. The design and construction of the approach races are important. For obvious reasons sharp angles and protrusions, sharp objects, narrow gates and slippery floors must be avoided. Approach races should not be too wide in that they should not allow the animal to turn around but should nevertheless provide for sufficient space for access to cope with emergency situations. They should contain a facility for evacuation to avoid long waiting periods in the race in the event of the slaughter line breaking down, e.g. an exit gate immediately prior to the stunning area. Animals should not be left waiting in the approach race; staff break periods should be anticipated and animals should not be moved forward from the lairage unless they can continue through the slaughter operation without delay. If races are designed with solid walls and with gates and doors which are sheeted and have the minimum of gaps underneath, less distraction is created for animals. The increasing use of
curved rather than straight races appears to be an advantage in that the natural curiosity of the animal may encourage it to move on around the bend. The incorporation of two-way opening gates provides flexibility in the system and also avoids the possibility of animals becoming jammed against them.

58. Self-closing metal gates and doors should be baffled against noise where used; very often animals will balk and retreat, particularly cattle in the approach to the stunning box, where a noisy, self-closing gate slams in front of them. The use of steelwork creates an unwelcome noise level generally and we would hope there might be scope for developing and using durable substitute material which is both stockproof and acceptable on hygiene grounds. Noise levels throughout slaughterhouses have been a concern and any development to reduce this is to be welcomed (see also paras. 109 and 119). We believe that less noise cannot but be of benefit to the animal.

59. The gradient of approach races into the stunning area can be critical; we have seen evidence that with sheep and pigs a slightly rising gradient encourages movement forward whereas a downward slope will discourage them.

60. There is a tendency for pigs in particular to crowd and clamber over their fellows in an approach race. In some pig plants, the race design incorporates vertically stepped side walls instead of a funnelling arrangement. We have seen such stepped walls in use; the dimensions of the steps are evidently critical and, if not properly designed and constructed, such a facility will not overcome the problems of funnelling pigs into a single-pig final approach race or automatic restrainer. Nevertheless the idea has much to commend it and should not be dismissed.

61. Lighting in the approach races should be sufficient to encourage animals to move forward. Cattle in particular will hesitate if being moved into a darker area and will balk at shadows, patches of bright light and even puddles.

62. More care needs to be taken to ensure that animals are securely penned in the lairage and have no opportunities for escape when being marshalled through the approach race. In the course of our visits we have seen animals which have escaped, apparently as a result of carelessness, and we have been concerned as well as surprised at the apparent lack of expertise and consideration in rounding them up. Likewise the entrance to the stunning pen, particularly for pigs and sheep, should be carefully controlled and guarded either by secure gates or human supervision to ensure that animals cannot push through the stunning pen into the slaughter area before they are required (see para. 118).

63. We have seen the incorporation of water sprinklers of varying designs in use in the approach races to pig stunning pens. The primary objective of these is apparently to reduce aggression and to settle the pigs; a secondary benefit is to improve conductivity when the electric tongs are subsequently applied to the dampened head. Provided the flow of water is no greater than a fine spray then, properly operated, this system can be beneficial. We have seen systems in
use where the water jet is so powerful that pigs have deliberately moved out of its path (see also para. 48).

64. Many of the points mentioned above in relation to unloading, lairing and handling in the approach races are specific guidelines which may not be appropriate for regulation but nevertheless need to be taken into account and are therefore recommended for inclusion in a Code of Practice (see Part III—Summary of Recommendations).

65. An interesting handling technique, which in theory is not permitted within the current hygiene legislation, is the use of a so-called ‘Judas sheep’ to lead animals into the stunning area. The technique uses specially trained sheep, kept in the lairage, which will of their own volition lead a group of their fellows from the lairage area through the approach races to the stunning pen. The retention of such an animal in the slaughterhouse appears to contravene the provisions of Regulation 22 of the Slaughterhouses (Hygiene) Regulations 1977 which requires that all animals delivered into a lairage should be slaughtered within 48 hours (72 hours in Scotland). Use of a ‘Judas sheep’ has been demonstrated to us and we were impressed with the technique. We therefore recommend that existing hygiene legislation should be amended to accommodate the use of such a facility which we consider has welfare advantages, but account should be taken of the welfare needs of the ‘Judas sheep’.

66. Elsewhere in the report (para. 34) we have recommended restricted use of electric goads and sticks. We have been particularly concerned at their excessive use in the approach areas to the stunning pens. Such use only serves to add to the stress and confusion arising for the animal which is already in a stressful environment. A similar general provision to that already existing in transit legislation for prohibiting the excessive use of goads (referred to at para. 34) should be introduced to cover animals in the lairage. In addition, where electric goads are used to move animals into the stunning area we recommend that their use should be restricted only to the hindquarters and then only to those animals which have space to move forward and are refusing to do so. We further recommend that the use of sticks or plastic piping in the approach races and stunning areas should be prohibited.

SECTION 4

Prohibition of slaughter within the sight of others

67. The existing legislation in England and Wales (Regulation 15(1) of the Slaughter of Animals (Prevention of Cruelty) Regulations 1958) requires that no animal should be slaughtered in a slaughterhouse or knackers’ yard in the sight of any other animal awaiting slaughter. This requirement does not apply to stunning where carried out by means of electricity or carbon dioxide (CO₂).
Further, Regulation 12 stipulates that ‘so far as it is practicable’ animals awaiting slaughter shall not see nor smell blood or slaughterhall refuse.

68. In effect this places a prohibition on the stunning (by any means other than electricity or CO₂) and sticking of an animal unless such an operation is carried out away from the sight of others. Much of what happens in the slaughterhouse in terms of slaughtering techniques and slaughterhouse design has stemmed directly from this requirement which in many ways is therefore fundamental and has, to our knowledge, never been seriously challenged. Although Scottish legislation does not contain an equivalent prohibition, it is common to find Scottish slaughterhouses adopting the same practice.

69. With electrical stunning of pigs and sheep (without restrainer systems) the normal practice is for small batches of these species to be driven into the stunning pen and the animals stunned, shackled and hoisted individually but in the full sight of their fellows. The animals do not appear to react to the sight of their felled fellows and it is not clear whether stress is heightened by such events. Once hoisted, the stunned animal generally passes from the sight of those remaining through to the bleeding line.

70. With a group of pigs a lot of noise will usually emerge whenever and for whatever reason they are being handled and we do not consider that being spectators at the stunning of their fellow creatures contributes to any increase in this normal pattern of noisy protest. Sheep are less vocal and appear to be more likely to bunch together in the stunning pen in a protective group— but again our impression was that their concern generally seemed to be directed more at the prospect of being caught and handled rather than any obvious fear of being stunned or seeing their fellows stunned, shackled and hoisted.

71. Sheep separated from their fellows will always be uneasy. Evidence of their natural inclination to be at ease in the presence of their fellows has been observed in their behaviour in automatic handling systems where we have seen animals placidly following each other up the approach races into the automatic restrainer but, conversely, ill-at-ease if they are isolated in such a race. We have also heard of cases, in a research environment, where sheep are more likely to settle in a restrainer (and look to the front, thereby presenting the head in the best position for stunning) if a fleece is placed in front of them.

72. Captive bolt stunning of any species generally involves the separation of an animal from its fellows. Present legislation has resulted in the use of individual stunning boxes which are designed for the purpose of screening the animal to be stunned away either from animals awaiting stunning or those being slaughtered. Stunning boxes for cattle (and often for horses) are generally approached by narrow, high-sided races, have high-sided metal walls and are located within the curtilage of the slaughterhall. (Comments on the design and use of stunning boxes are at Section 5/1.)

73. In our view the design of such boxes creates considerable stress for the animal. Cattle will frequently balk at the approach race and this all too often results in the excessive use of goads; the noise of the slaughterhall activity, together with the banging of the side and rear gates of the metal-sheeted box,
will deter them from entering and once encased in the box they are trapped in a noisy and very strange environment—in some cases for several minutes while hold-ups on the slaughter line ahead are being cleared. At no stage can they see or have contact with their fellow creatures. In our view such handling arrangements prior to stunning often create a high level of stress, even terror, for the animals.

74. We find it difficult to see justification for prohibiting the stunning by captive bolt within the sight of others when group stunning by electricity is permitted. We have been unable to trace any positive evidence or reasons for the original introduction of this prohibition which has been a feature of legislation for a very long time, although it seems likely that the provision stemmed from the assumed sensitivities of horses. Neither have we seen any scientific evidence as to what extent animals are aware of what is happening to their fellows.

75. We have formed a subjective opinion that animals are fearful of the situation generally in the slaughterhouse—of the noise, smell, handling and strangeness of the surroundings—but that they do not show any obvious added fear when their fellows are being stunned. We understand that in situations of mass slaughtering on the farm (e.g. at times of outbreaks of foot and mouth disease) they show no apparent alarm when their fellows are being shot.

76. One reason for the distinction in the prohibition rule between the methods of stunning may be that animals are startled by the noise of the pistol; we consider that the advantages from their remaining together in a group outweigh this disadvantage. Another reason is that some blood may splash from the wound made by the shot. We do not know whether animals are aware of their fellows being bled, other than that the whole environment is strange and fearful, but the amount of blood in evidence after stunning by captive bolt is negligible compared with that gushing out after sticking.

77. The prohibition has thus led to killing area designs in some slaughterhouses which give rise to welfare problems. Two major problems are (i) the stress created for the animal by being separated from its fellows together with the noise associated with the operation of the stunning box; and (ii) the delay between stunning and sticking which increases the possibility of the animal regaining consciousness either before sticking or during bleeding out.

78. If the Regulations were amended to permit all stunning, including that by captive bolt, to be carried out on animals in the presence of their fellows it would provide scope for a complete re-think on the handling arrangements prior to stunning. Cattle obviously need to be restrained, both for the purpose of operator safety and for the correct positioning of the stunning instrument, and individual penning may well be essential but the need for a totally enclosed pen and the screening off of other animals is in our view open to considerable doubt.

79. Much of the delay referred to in 77(ii) above stems from the hygiene requirement that animals are shackled and hoisted off the ground before
sticking and there is thus limited scope for improvement; but some improvement could be achieved by better design of killing areas.

80. In the context of the prohibition rule the term ‘slaughter’ is not fully defined in any of the Regulations referred to at para. 67. However, in our view it should cover the two stages of the act, i.e. stunning and sticking. We recommend that the law be changed to make a clear distinction between these two stages of slaughter and we further recommend that all prohibitions on stunning animals in the presence of their fellows be lifted. We recommend that Scottish legislation be amended to prohibit the sticking of animals within the sight of others.

81. Elsewhere in this report we recommend investigations into outright killing, instead of stunning, prior to sticking (see Section 4/2). Our recommendations for changes in the prohibition rule would not be affected by any such developments which would still result in a two stage act, i.e. killing and sticking.

82. We have seen no evidence on how the animals are affected by being bled in front of each other and in the circumstances must give the animals the benefit of the doubt. We cannot therefore recommend that the law be changed to permit animals to be stuck in front of other animals. Such a change could, in any case, lead to greater callousness among slaughterhouse employees.

83. Certain safeguards need to be attached to any change in the law:
   (i) stunned animals must not be dragged over other animals awaiting stunning nor should they be left in a position where they can be trampled by other animals;
   (ii) stunning operators must ensure that one animal is properly stunned before moving on to stun another;
   (iii) noise needs to be kept to a minimum. Consideration needs to be given to the design and positioning of hoisting equipment (see paras. 118 and 119);
   (iv) the flow of animals needs to be maintained by careful design of the killing area which takes account of natural behaviour; the use of electric goads must be kept to an absolute minimum (see para. 66).

SECTION 4/1

Assessment of unconsciousness

84. It would seem to be of the utmost importance from the point of view of humaneness that the slaughterhouse personnel responsible for the carrying out and supervision of stunning and sticking should be able to assess readily the degree and duration of unconsciousness produced by the stunning devices being used. We have become aware during the course of our investigations that not only are there differing assumptions made in slaughterhouses as to the
signs which should be used to assess unconsciousness and insensibility but there are also varying and sometimes conflicting conclusions to be drawn from the published research in this field.

85. Under practical slaughterhouse conditions there are a limited number of relatively crude criteria which can be used to assess unconsciousness and insensibility. Decisions will have to be based on such signs as the stunned animal remaining motionless with no response to painful or disturbing stimuli and with no blink reflex when the cornea is touched and no pupillary contraction response to a strong light shone into the eye. It has been suggested that, owing to the local effects of the electric current, the corneal and pupillary reflexes may sometimes be absent, yet the animal may still be sensible to pain.

86. The generally accepted sign of a successful stun as produced by a captive bolt pistol is that the animal should collapse instantly, often with all four legs flexed under the body. There will then be muscle contractions for up to five seconds and in some instances the body and neck will quiver before the head finally rests immobile on the floor with the ears drooping. Erratic, uncoordinated reflex movements can occur after successful stunning—they can even be seen after decapitation—but they do not necessarily indicate consciousness or sensibility. With electrical stunning, research has indicated that a stun has been fully effective if an electroplectic fit takes place in which there is a rapid and full extension of the back legs with the head jerking backwards and the eyes rolling; the animal usually stops breathing. When it starts breathing again it is beginning to come out of the electroplectic fit. An electrically stunned animal can remain paralysed for up to 30 seconds even where consciousness is regained. Although completely paralysed and immobile an animal can be fully conscious and aware of pain and can still be conscious and sensitive to pain for several seconds after the heart stops beating.

87. In the course of our investigation it was often difficult to assess whether animals, having been stunned, shackled and hung, were regaining consciousness either prior to sticking or in the course of bleeding out. The reflex movements seen after sticking were generally erratic, uncoordinated movements which did not necessarily indicate consciousness. Likewise the bleating of calves suspended on the bleeding line, though distressing, did not necessarily indicate consciousness and sensibility.

88. We have concluded that unconsciousness and insensibility are being assumed to exist in many slaughtering operations when it is highly probable that the degree is not sufficient to render the animal insensitive to pain. Whilst we recognise that the testing of the degree of consciousness and sensibility can only be accurately assessed in laboratory conditions which are not feasible in a slaughterhouse environment, we consider that more care should be taken in the slaughterhouses to ensure that in so far as can be judged, the stunning techniques are fully effective in rendering the animal insensible to pain. We therefore recommend that it should be the duty of a responsible member of the slaughterhouse staff (not the stunning operator) to carry out a regular check, at least daily, that so far as can be ascertained stunned animals are remaining
unconscious and insensible throughout the hanging, sticking and bleeding out operation.

89. Nevertheless, there is considerable doubt in this whole area of awareness of pain during the period between stunning and death and we recommend more research should be undertaken 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 an awareness of pain.

SECTION 4/2

Bleeding out – the necessity

90. It is generally claimed that the bleeding out of animals is necessary in maintaining the quality of the meat and its keeping potential.

91. For an animal stunned by traditional methods, death is achieved as a result of the bleeding that follows. This is by exsanguination, when insufficient blood remains circulating thus depriving the body and brain of their oxygen supply. We understand that about 70 per cent of the total blood loss occurs in the first two minutes following sticking. It is estimated that the blood loss (although this can depend on the sticking technique – discussed later at Section 6) represents 60 per cent of the animal’s blood with 20–25 per cent remaining in the viscera and 15–20 per cent in the muscle and bone. The traditional assumption has been that the action of the heart is necessary to pump the blood out of the animal. Work undertaken on pigs at the MRI has provided evidence that cardiac arrest before sticking and bleeding has no effect on the amount of blood lost, the rate of loss or the residual content of blood in the meat. Evidence also exists that cardiac arrest in pigs during exsanguination with the use of low voltage stunning carried out in the traditional manner (i.e. application of electrodes to the head) is not uncommon and again this apparently has no effect on meat quality. Further, increased yields of blood following sticking do not reflect a lower residual blood content in the meat, but rather in the viscera. We have concluded therefore that the release of blood from the animal need not necessarily occur prior to death.

92. We accept that it is early days in the research and development of work on outright killing related to bleeding. Experience seems to be largely limited to electrical stunning of pigs and sheep. Nevertheless, we consider it is important to stress our conclusion that traditional assumptions that bleeding out must take place while the heart is functioning are not sacrosanct and should a change of attitude come about variations could advantageously be made in the design and operation of stunning techniques (see para. 139 – Head to Back Stunning).
93. Existing legislation (Section 36(1) of the Slaughterhouses Act 1974) provides for instantaneous slaughter by means of a mechanically-operated instrument in proper repair; we hope that the techniques which both stun and kill (but not instantaneously) are in fact permitted under this provision. If not, we recommend amending legislation.

SECTION 5

Stunning (general comment)

94. Current legislation requires that animals which are slaughtered in a slaughterhouse or knacker’s yard shall first be stunned to render them ‘instantaneously insensible to pain until death supervenes’. This requirement does not apply if slaughter is instantaneously carried out by means of a mechanically-operated instrument in proper repair. Nor does it apply to animals slaughtered by Jewish or Moslem methods.

95. Apart from the exceptions referred to above, the method of slaughter in this country is invariably by the two-stage process of first stunning and then sticking the animal for bleeding out. Only in the slaughter of rabbits (which is not currently subject to the stunning provisions referred to above) have we seen instantaneous slaughter without prior stunning where death was caused by a heavy blow to the head prior to bleeding out (see paras. 208–214).

96. The whole concept of the two-stage kill (i.e. stunning and sticking) has evolved from this traditional requirement for bleeding out. To help improve appearance and keeping quality of the meat it has always been considered important that the heart should remain beating as long as possible after sticking to ensure that as much blood as possible is removed from the flesh and blood vessels of the animal. The need for bleeding out has already been discussed at Section 4/2 and more will be said later about sticking technique. The purpose of stunning is to render the animal unconscious and insensible to pain so that it can be stuck and bled without suffering; it is not required to kill the animal but merely to render it unconscious until death by exsanguination supervenes. If this objective is to be met, the stunning technique used must be effective both in rendering the animal insensible to pain and for that period of insensibility to last right through until the animal would otherwise be rendered insensible by virtue of blood loss and death.

97. A major area of concern in our review has been the effectiveness of the stunning techniques being used, both in relation to the equipment and the efficiency of its operation. This is discussed at Section 5/2. The design of the stunning areas and the boxes in which cattle are held for stunning also contribute significantly to the efficiency of the stunning operation and we consider there to be scope for change and improvement as indicated in the following section.
Design and use of stunning pens/boxes

Stunning boxes for cattle

98. Current legislation includes a prohibition on the slaughter of animals within the sight of others. We have questioned the need for the retention of this prohibition as it relates to stunning and have recommended its abolition (see Section 4). We recognise that the implications of this recommendation would take some time to have an effect on the design of stunning boxes. In the meantime, therefore, our findings and recommendations on the current design and use of stunning boxes are relevant.

99. Most cattle are now stunned in purpose-designed stunning boxes. The purpose of such a box is to restrain an individual animal where it can be held for effective stunning away from the sight of other animals and where, after stunning, it can readily be manoeuvred for shackling and hanging for the sticking and bleeding out process to follow with a minimum of delay.

100. Because of the current need for the animal's vision to be screened off from slaughterhall activities, all the boxes we have seen in operation have been designed with solid metal side and end walls. The most common design is for one of the side walls to be hinged and for the stunned animal to be ejected on to the floor of the slaughterhall. To aid this ejection the box often incorporates in its design a protrusion (usually of concrete) at floor level along the inside of the opposite side wall, so that as the animal falls it is pushed towards the hinged side and ejected. Access to the box is through a rear door which is normally of a guillotine design. The floor of the box, which should be non-slip concrete, is frequently stepped lengthwise, again to aid ejection from the box and to encourage the animal to stand in a forward position. To accommodate full size cattle, boxes are generally of a deep construction, i.e. to well above the level of the animal's head. The position for the stunning operator is usually to one side of the animal's head, standing at a level which allows him to lean over into the box, supported at approximately waist level by the side wall.

101. The design of such boxes results in the animal finding itself in a restricted, closely confined, dark and noisy place. It can see very little except the stunning operator above its head, the slaughterhall ceiling and machinery. It is an uninviting and inhospitable environment which, in our view, is more likely to produce stress than calmness in the animal. We believe the design and construction of such boxes could be improved.

102. The noise is considerable. The moving parts of the stunning box operate with much clanging and banging and the metal construction of the box means that any contact with the walls either from the outside or inside will create noise. In addition there will generally be high noise levels within the slaughterhall in which the box is usually situated, particularly in large slaughterhouses with high throughputs. Most of this noise will stem from the working...
machinery, e.g. shackles and conveyors, but will also be from the shouting of operators trying to make themselves heard above other noise (see also para. 58 and para. 109).

103. A steamy atmosphere, often prevalent in large slaughterhalls, can be a further unfamiliar factor for the animal. We were particularly concerned to find excessively steamy atmospheres in some very modern slaughter premises. Our concern was not only for the effect this created on the animals awaiting stunning but also on the operators having to work in such an environment. **We consider that it should be possible in the design of modern slaughterhouses to make better provision to control and overcome such problems.** We are of the opinion that there is a direct link between environmental conditions and operator attitudes and behaviour and we would like to see improvements to the working environment.

104. Another major problem in the use of stunning boxes is the freedom of head movement for most animals whose inclination is to look for a light source (possibly as a means of escape). If the design of the box leaves gaps at the foot then this can result in the animal putting its head down, thereby causing problems for the stunning operator. Some slaughterhouse managements believe that if a strong light source, e.g. a window, is positioned above the box and in line with the position of the stunning operator, the animal will be encouraged to direct its head towards that light source, thereby presenting an effective stunning position. We have insufficient evidence to endorse this theory but consider it is worth recommending for further investigation (see para. 110). Freedom of movement of the animal's head together with the difficulties for the stunning operator in leaning into the box, generally with one hand supporting himself on the side walls, all make for bad positioning of the stunning gun and increase the risk of ineffective stunning.

105. A further problem created by most current designs is the difficulty in getting at an animal which has collapsed in a box either through injury or ineffective stunning. Apart from manhandling such an animal through the side ejection panel (at great risk to personal safety and creating distress for the animal) there is generally no way of gaining access to the base of the box to operate the stunning gun and we **recommend that a facility to deal with this contingency should be provided.**

106. A final area of concern is the tendency we sometimes saw of retaining animals for lengthy periods in the stunning box prior to stunning. This generally occurs because of hold-ups on the slaughter line ahead and we have observed animals being kept in the box for up to five minutes. In our view, this creates considerable unnecessary stress to an animal already in a stressful situation. **We therefore recommend that animals should not be allowed into a stunning box until the way is clear for them to be stunned, slaughtered and bled.** In addition we would like to see provisions in the design of a box for evacuation (possibly through the front of the box) and a facility for an animal thus evacuated to be returned to the lairage (see also para. 57).

107. In the light of these findings, we have concluded that at present the design of a high proportion of boxes is unsatisfactory, both in respect of the
way in which the animal is restrained and of the ease of operation for the slaughterman. Although we have not seen many designs incorporating head restraints we consider that there is much scope for development of such a facility. Some designs already incorporate a head yoke which appears to work effectively. There are also designs where an aperture or shutter in the front wall of the box allows the animal's head to be firmly secured and gives the slaughterman a comfortable and balanced shooting position standing at ground level. Even under current legislation, provided the animal's view can be screened off from other slaughter activities, such a design would seem to have much to commend it, although we appreciate such a facility could create problems in the release of the animal's head after stunning. It is desirable that a head restraining device is used to position the cattle for stunning and we therefore recommend that all cattle stunning boxes should be required to contain such a device.

108. The development of body restraint cattle crush systems would also seem to have potential scope for use in slaughterhouses. We have seen adult cattle undergoing religious slaughter in a pen, designed to a patent specification held by the American Society for the Prevention of Cruelty to Animals, into which the animals enter singly from a conventional race. As a guillotine gate closes behind the animal, it is moved forward by a wedge-shaped pusher attached to the gate until its head projects from the opening at the opposite end of the pen. It is then secured by a neck yoke, which moves downward, and a plate which travels up from the floor to lift the underside of the body. The head is raised by a chin lift, extending the neck and thus facilitating its transverse incision from below. The guillotine gate, wedge, yoke, plate, chin lift and side gate of the pen are all pneumatically operated and are controlled by an operative standing at a control panel on the opposite side of the pen to the side gate. As soon as the neck has been incised, the side gate is raised and the shackler has ready access to one of the animal's hind legs. When bleeding is sufficiently advanced, after some seconds, the yoke, chin lift and plate are released and the animal is pulled out of the pen by the hoist, transferred to the overhead rail and moved forward to the dressing line. We consider that the development of a pen of this type, to be used both for stunning and sticking and incorporating a restrainer, could have many benefits and has considerable potential for general use in slaughterhouses.

109. To overcome the noise problems within the boxes of the existing design we recommend that metal rear and side gates to the box should be fitted with noise absorbent baffles, e.g. of rubber. The possibilities of incorporating other materials which are less noisy but durable in the design of these moving parts should be investigated (see also para. 58).

110. If boxes are to remain enclosed they should not have gaps at the base. The advantages of having a strong light source above the animal to encourage correct head positioning should be subject to more positive investigation and, if research findings confirm the advantages, consideration should be given to the provision of such a light source in all stunning box designs (see also para. 104).
111. Current legislation defines a cattle ‘stunning pen’ as being ‘constructed so as to confine without discomfort only one animal at a time and so as to prevent any substantial movement of the animal forwards, backwards or sideways’ (Regulation 21(1) of the Slaughter of Animals (Prevention of Cruelty) Regulations 1958). In our view there is considerable scope for re-designing traditional cattle boxes and still meeting the provisions of this Regulation. Not only the concept of the need for a fully enclosed box but also the concept of stunning in one position and shackling, hanging and bleeding in another offers scope for reconsideration.

112. The depth of the pen has already been mentioned as being a contributory factor to the difficulties of the accurate positioning of the stunning weapon. Our impression is that most pens have been designed to cope with the largest possible animals and that in practice the majority of animals being presented for slaughter are much smaller; this therefore exacerbates the difficulties for the stunning operator. **We recommend that cattle boxes be designed to accommodate safely both the larger and the smaller animals with a facility for stunning at different levels.**

**Stunning boxes for horses**

113. We have seen only a limited number of horses slaughtered in the course of our review. When horses are stunned in a box which is similar in design to the cattle box then our above recommendations also apply (see also para. 215).

**Stunning pens for smaller species (i.e. pigs, sheep, calves and goats)**

114. Apart from slaughterhouses in which automatic restrainers are used for stunning (considered at para. 122), stunning of all species other than cattle and horses is generally carried out in an open pen which can accommodate batches of animals for electrical stunning or animals individually for captive bolt stunning. Incorporated in most of these pens is a shackling and hanging conveyor system for transferring the stunned animal on to the bleeding line. The approach race to the stunning pen generally terminates with a barrier or automatic gate. Animals are either driven, if in batches, or manhandled individually into the stunning pen.

115. In our view there are two critical factors in the satisfactory design of the pen. These are: (i) a facility for restraining the animal so that its head can be correctly positioned for accurate stunning; and (ii) a facility for transferring the stunned animal on to the bleeding line with the minimum of delay to ensure that consciousness is not regained before death. In many cases we have not been convinced that these criteria are satisfactorily met.

116. Whilst we favour the facility for animals to be stunned in batches and not therefore separated from their fellows (see Section 4) nevertheless there is a need for individual restraint to overcome the problem of chasing animals around a pen and stunning them incorrectly because the head is not held steady (see also para. 128 on the unacceptable practice of catching animals with electric tongs).
117. Unless there is provision for a form of restraint the difficulties mentioned above will inevitably occur. We have occasionally seen the use of purpose-built restraining rails and gates to manoeuvre and restrain the animal in the pen. This is a development which could usefully be pursued, particularly if some simple form of head restraint can be incorporated in the design, e.g. a hinged crescent-shaped bar which could hold the animal's head against the wall.

118. Ease of access to the animals in the pen and avoidance of unnecessary injury to the animals can be assisted by avoiding angles and protrusions in the designs of walls and the machinery incorporated in the pen. In too many cases we have seen it appears to be all too easy for animals to get behind the hoist and to stumble on the base of it. Care also needs to be taken to ensure that animals cannot escape from the stunning pen through into the sticking area and into the slaughter hall.

119. As with cattle stunning boxes, noise levels can be very high. There seems to be scope for incorporating less noisy materials in the construction of conveyors and shackles and we understand that in some slaughterhouses the installation of a conveyor line using shackles made of a plastic material considerably reduced noise (see also paras. 58 and 109).

120. An essential element of effective stunning is that once stunned animals should be shackled, hung and bled with a minimum of delay. We have expressed elsewhere in the report our concern at the delays in bleeding the animal and have commented on the extent to which this results from the current necessity to separate the bleeding line from the stunning area. Other factors which we have found contributing to the delay are hold-ups or overloading on the bleeding line which create a backlog through the whole slaughter operation. Also, in some smaller slaughterhouses, problems arise where there is only one slaughterman carrying out the catching, stunning, hanging and bleeding operation; there will also be a tendency for him to stun a batch of animals before moving on to bleed them. We recommend that this practice should be made illegal.

121. We are aware that it is the practice in some slaughterhouses to attach shackles to animals' legs before or at the same time as they are stunned (i.e. when the animal is still fully conscious). Whilst we appreciate that such a practice can reduce delays between stunning and bleeding, we nevertheless consider that it adds to the stress of the animal and we recommend that shackling should be prohibited while the animal remains on its feet. We have not seen animals being hung before stunning but have been reliably informed that it does occur and would strongly deplore such a practice. We recommend legislation should clearly outlaw it.

Automatic restrainers

122. There is an increasing use of automatic restrainers for smaller species in the larger slaughterhouses in this country. We appreciate that the cost of such installations imposes a constraint on their wider use by smaller abattoirs but we have been impressed by such systems as we have seen and would commend
them on welfare grounds. We have seen automatic systems in use for sheep, pigs and veal calves. The animals are generally held in a V-shape conveyor with a drop-away floor and presented for stunning in a forward facing position, with their bodies restrained by the side walls. Although the animal's head is not restrained, in the cases we have seen it appears to be in a good position for the stunning operator who stands either to the side or front of the conveyor. Once stunned the animal is generally released forwards into a tray from which it is shackled, hung and bled. The animals we have seen in such systems appear to be effectively restrained and well positioned for stunning. Animals were generally calm and there seemed to be some merit in designing the approach race conveyor at an upwards angle. As with any mechanical system, its effectiveness is dependent on those operating it; such factors as the speed and manner in which animals are loaded on to the approach conveyor, the efficiency of operation of the stunning equipment and the speed in getting animals on to the bleeding line are all critical. As with other stunning facilities we recommend that there should be provision for evacuation of the restrainer and its approach race to cover the eventuality of hold-ups on the line or an injury to an animal on the conveyor.

SECTION 5/2

Stunning equipment and its operation

Introduction

123. Current legislation (Section 36(1) of the Slaughterhouses Act 1974) requires stunning to be 'effected by means of a mechanically-operated instrument or an instrument for stunning by means of electricity, being in either case an instrument in proper repair' which will instantaneously render an animal insensible to pain until death supervenes. Provision is also made in England and Wales (in the Slaughter of Pigs (Anaesthesia) Regulations 1958) for stunning by CO₂. A further provision at Regulation 16 of the Slaughter of Animals (Prevention of Cruelty) Regulations 1958 is that 'no person shall use any instrument for slaughtering or stunning an animal unless his ability and physical condition at the time qualify him to use it without inflicting unnecessary pain on the animal nor shall he use a mechanically-operated instrument in such manner or in such circumstances or in such need of repair as to give rise to the risk of causing unnecessary suffering'.

124. Whilst we endorse the intention of these provisions, we are not satisfied that they are adequately enforced. Later in this report we propose further safeguards to ensure that both the efficiency of the equipment and the efficiency of the operator are at an acceptable standard. Our findings on individual methods of stunning are as follows.
Electrical stunning

125. This method is now extensively used for pigs, for many sheep and for some calves. Stunning is performed by passing an electric current through part of the animal’s brain for the purpose of producing instant unconsciousness. If insufficient current passes through the brain the animal can become paralysed but still be fully conscious and able to feel pain. We have seen a considerable number of electrical stunning systems in operation. The majority of systems seen have been manually operated although we have seen an automatic system operating on pigs. Most systems were based on low voltages but we have also seen the increasing development of high voltage stunning and are aware of high frequency stunning.

Low voltage electrical stunning

126. This is the most common system we have seen in operation. The voltage is applied to the animal using a pair of scissor-like tongs with circular or rectangular electrodes at the end of each arm which are usually immersed in a saline solution and then applied to either side of the head so that the current passes through the brain. The voltage of such systems can usually be adjusted by switches on the control panel which is normally situated in the stunning area. The voltage should be at not less than 75 volts (50 Hz mains frequency) and the current applied for not less than seven seconds. Although we know that MAFF Circulars have been issued (in 1958 and 1978) to local authorities stressing the importance of the minimum current and application time, our investigations have indicated a woeful ignorance of the requirements which are frequently being disregarded.

127. The positioning of the electrodes is critical. Ideally this should be on a line between the eye and the base of the ear to ensure that the brain is directly between the two electrodes. The tongs should not be applied behind the ears or on each side of the neck, otherwise the animal may be paralysed without being rendered unconscious and may suffer severe pain. Research findings have indicated that, even with correct positioning of the tongs, some 95 per cent of the electrical current flows into the body, so that only a small current traverses the brain—although this is sufficient to precipitate an electroplectic fit and insensibility. The effect of moving the electrodes back over the head or neck away from the brain is to reduce even more the strength of the current flowing through the head.

128. In a high proportion of the low voltage electrical stunning operations we have seen on batches of pigs or sheep the positioning of the tongs has been inaccurate. It was all too common for the tongs to be used as a method of catching and immobilising the animal rather than as an accurately placed and effective stunning instrument. We recommend that electric tongs must not be used other than for stunning an animal and must be correctly positioned in accordance with the manufacturer’s instructions (see also paras. 133 and 162). Our recommendations in relation to the design of stunning pens and the handling and restraint of animals in them are also very relevant to the resolution of this problem (see Section 5/1).
129. Another major area of concern has been the failure to apply low voltage tongs for the minimum seven seconds advised. It is fair to assume that in the course of our slaughterhouse visits we have been given the benefit of seeing a longer application of tongs than may perhaps have been the norm when the stunning operation was not under such close scrutiny. We were particularly concerned therefore to find that in far too many of the cases seen application was for less than seven seconds and this has led us to assume that in a high proportion of cases the application time is below the minimum. We can understand the difficulties in a busy slaughterhouse environment of meeting a requirement for specific timing of an operation; nevertheless we are under the impression that in all too many cases the objective was to fell the animal as quickly as possible and, provided it was paralysed and immobile, to assume that it had been effectively stunned and could therefore be shackled and hung.

130. It cannot be stated too forcibly that in the training of slaughtermen (discussed later at Section 9) there is a very real need for more awareness of the effects of electrical stunning, the assessment of unconsciousness and insensibility and the consequences of both incorrect positioning of tongs and the failure to apply them for the minimum specified time.

131. To overcome the problem of accurate assessment of the time of application, we recommend that there should be a requirement that all manual electrical stunning systems should incorporate, either in the tongs themselves or on the control panel (provided it can clearly be seen by the operator), a warning light or buzzer which gives a clear indication when the prescribed minimum period of application is up. In addition, the need for correct voltage and current levels is also a critical factor in the effective operation of the equipment. Tongs should therefore be designed to incorporate a sensor or similar fail-safe device which would ensure that the equipment did not function unless the correct current for which it was set would flow. We appreciate that such requirements would not overcome the problem of incorrect positioning of tongs but nevertheless feel there are still considerable benefits to be gained. We understand that designs incorporating these features already exist and their use should therefore be pursued. Once such systems are introduced then regular supervision to ensure that proper notice is being taken of them must be a requirement.

132. In many cases the positioning of the control panel and switches was not within easy reach of the operators and it was common to find units being operated at the wrong voltage for the species concerned or where the operator neither knew what the voltage should be nor how to adjust it. We have also seen instances where the switches on the control panel were broken or rusted and could not be adjusted. We also recommend that there should be regular checks on the equipment including the control panel to ensure that it is functioning properly and also that the desired current is being delivered to the animal (see also para. 161).

133. We recommend that, for all electrical stunning systems, operators should be required to abide by the manufacturers' guidelines on the correct voltage
and current, on the correct time of application, and on the positioning of the electrodes. In some European countries legislation already exists which specifies the site of application of electrodes and sets electrical parameters for approved electrical stunning systems and we would hope that our recommendations could be incorporated in legislation of a similar nature (see also para. 162).

134. From our observations, low voltage electrical stunning of pigs, if properly operated, appears to give an effective stun. The use of this system on sheep is much less efficient because the wool on their faces prevents good electrical contact. The existence of horns creates a similar problem. It is even more important therefore in using low voltage electrical stunning for sheep to ensure that the correct voltage, current and time application are used. We are advised that manufacturers specify a minimum of 90 volts for sheep stunning.

135. Increasingly, however, doubts are being expressed whether low level electrical stunning is effective in rendering an animal 'instantaneously insensible to pain'. It is possible that some seconds pass, after the tongs have been applied, before the animal is fully unconscious or insensible to pain. It is obviously essential to try to establish whether or not this is so because the implications of a positive finding would be far-reaching bearing in mind the large proportion of animals, particularly pigs, which are stunned by this method. **We therefore recommend that research work be undertaken in this area as a matter of urgency.** (Section 4/1 is also relevant.)

High voltage electrical stunning

136. There is a growing tendency to use high voltage systems, particularly as they reduce operator time. Experience is still being gained in the effective operation of such systems but we are satisfied that if properly operated at the voltage and for the time specified by the manufacturers they are an effective stunning method, particularly if incorporated with a restrainer system. Use of these systems obviously creates the need for more care in terms of operator safety. There is some concern within the industry that the use of high voltages creates unacceptably high levels of blood splashing in the carcase. It is also claimed that bone shattering can be the result of high voltage stunning, but it is our understanding that this results from the application of the current a second time, in other words incorrect application of the tongs in the first instance. Both are problems resulting from the contractions and convulsions of the stunned animal and are thought to be minimised if animals are stunned correctly, preferably in a restrainer. There is no evidence that such occurrences create suffering for the stunned animal but it is obviously essential to ensure that sticking following high voltage stunning is carried out quickly.

137. Recommended application time for high voltage stunning is normally two to three seconds. Even so we have seen the system operated for less than one second. **We would again recommend a prohibition on the application of such equipment for a shorter period than the time specified by the manufacturers.** High voltage systems are best incorporated with automatic
restrainer systems so that the head of the animal is presented in such a way that the electrodes can be accurately applied in safety by the operator. Such automatic restrainer systems as we have seen in operation appear to work effectively and the positioning of the high voltage equipment appears to be accurate. **We recommend the use of such systems.**

138. Some high voltage tongs include in the design provision for water ejection at high pressure from the electrode tips which is intended to make for better conduction of the electrical current. We have seen high voltage systems in operation on sheep both with and without water ejection and both systems seemed to work effectively.

### Head to back stunning

139. We are aware of research and development work on high voltage head to back electrical stunning systems for pigs and for sheep. Such systems (using 300 to 400 volts) apply electrical currents simultaneously to the head and to the back (over the heart) and, in addition to anaesthetising the brain, cause cardiac arrest. Research findings have indicated that with such a technique the animal suffers brain death (from the effect of the heart dysfunction cutting off the oxygen supply to the brain) well before the anaesthetising effect of the head stun, i.e. the eleptiform phase, ends. In research work, undertaken by the MRI, brain activity ceased on average at 23 seconds after head to back stunning commenced whereas with a head stun only, (i.e. when the heart was allowed to continue functioning normally) the eleptiform phase lasted for an average of 50 seconds. This technique could therefore eliminate the risk of the animal regaining sensibility during sticking and bleeding out and the interval between stunning and sticking would have no welfare significance because the animal would be dead within less than half a minute, i.e. while the eleptiform phase from the head stun still existed, and death would result regardless of when sticking occurred. We understand there is no adverse effect on bleeding out or meat quality (see also para. 91) and, in addition, it is claimed that the reflex actions of the stunned animal are reduced thus creating easier handling for shackling and bleeding. The system can only be fully effective if used with a restrainer system for the presentation of the animal. There are therefore the obvious constraints of cost in adopting such a system and also the need to ensure that full account is taken of the safety of the operator. There remain unanswered questions about the effect on the animal and more research is needed before we can commend the system without qualification. For example, it is not clear whether the ventricular fibrillation induced by the heart stun is entirely painless during the first few seconds after application and this point needs to be investigated further. (It is technically very difficult to record the brain’s own electrical activity, and thereby brain activity and responses which are assumed to indicate pain, whilst applying a much greater electrical current from an outside source. For this reason it is difficult to determine the sensitivity of an animal to pain during the first few seconds of stunning while the electrical current is being applied.)
Automatic stunning systems

140. In larger slaughterhouses with high throughputs, there is increasing interest in automatic stunning systems. We have seen such a system in operation on pigs in Holland and were generally impressed by its potential. The automatic system incorporates a restrainer and provides for the heads of the animals to pass against electrodes suspended on hinged aluminium plates. The system operates at a high voltage with a short stun time and generally incorporates a fail-safe system. We were aware, however, of problems in evacuating animals, e.g. casualties, from the restrainer and the system needs to incorporate adequate facilities to overcome this problem.

141. In commending such automatic systems we appreciate that cost is a considerable factor and, at present, restricts the use of such systems to slaughterhouses with a high throughput. The use of such systems calls for a high degree of technical knowledge and surveillance by the slaughterhouse operators. As with any automatic system it is essential that a close watch should be kept to ensure the system is operating properly, that the equipment is kept in proper repair and is regularly checked to ensure that the necessary voltage levels are maintained and that animals can be easily evacuated in the event of a malfunction of the system.

High frequency systems

142. Most conventional electric stunners use a sinusoidal (i.e. peaks and troughs) wave form of electric current which cycles 50–60 times per second (i.e. low frequency). We are aware that high frequency systems are available which operate at up to 1750 Hz and which can also use a square wave form. Some evidence suggests that with such systems a slightly higher proportion of the overall current flows across the brain and gives a higher degree of stunning efficiency. Other findings have indicated that higher frequencies have failed to produce instant unconsciousness.

143. We have not seen such systems in operation and have very little knowledge of them. We are not therefore qualified to give an opinion but would simply suggest that more information is needed and that this is a possible field for further research.

Knowledge of electrical systems

144. The whole area of electrical stunning in relation to voltage, frequency and amperage is a complex area which is understood by a very few even within slaughterhouses operating electrical stunning systems. In our opinion the subject is highly technical and confusing and a lot more guidance needs to be given by manufacturers to users of equipment on the operating settings for their equipment and the effects if these are not complied with. It may well be that there is also scope for an advisory code to be issued to the slaughtering industry providing a plain man's guide to such technicalities.
Captive bolt stunning

145. Captive bolt pistols, most commonly used for cattle, calves and goats but also for some pigs and sheep, stun by a bolt which penetrates the skull and destroys part of the brain. The objective is to render the animal insensible without impeding the operation of the heart. The bolt is propelled either by a blank cartridge or by compressed air.

146. In the course of our visits, we have seen a considerable number of slaughter operations using captive bolt pistols. As with other stunning systems, provided they are used properly, we consider them to be an effective method of stunning. However in some cases we were not satisfied that they were being properly used.

147. The major cause of improper stunning is incorrect positioning. This is often created by movement of the animal’s head and consequent deflection of the pistol impact. The design of the stunning box is therefore a critical factor and we hope that our recommendations on this (see Section 5/1) will contribute to an improvement in stunning techniques. It is most important that the muzzle of the gun is held firmly against the head of the animal and in the correct position. Incorrect positioning may cause the animal to go down but may fail to produce unconsciousness and insensibility and we have seen the unpleasant effects of such ineffectual stunning where a semi-conscious animal has had to be dropped out of the box to be re-stunned. Correct positioning will vary according to the species being stunned. For cattle, the point of penetration should be in the middle of the forehead at the intersection of two imaginary lines drawn from the back of the ear on one side to the corner of the eye on the other. Here the brain is directly under the thinnest portion of the skull and the penetration therefore has the greatest effect. **We recommend that stunning in the poll position for cattle should be disallowed**; there is a danger that penetration merely severs the spinal cord which will paralyse the animal but may well leave it conscious. For pigs, the positioning of the pistol should again be the forehead and ideally about 2 cm (3/4 in) above an imaginary line between the eyes. For sheep, a stunning position slightly higher than that recommended for cattle, is most effective. **We recommend that diagrammatic advice (as contained at Appendix D) on correct positioning for individual species for captive bolt pistols should be incorporated in the proposed Code of Practice.**

148. In the course of our slaughterhouse visits, we have frequently examined carcase heads to check the site of bolt penetration. In our view, there were far too many cases where penetration had not been at or near the recommended position and also evidence of a considerable number of double shots (i.e. indicating that the first shot had missed its proper target).

149. In addition to correct positioning, the sharpness of the bolt and the weight of the charge in the cartridge, which in turn affects the degree and speed of penetration of the bolt, can be all important. Here again there was evidence that manufacturers’ guidelines were not always being followed. It is particularly important for species with thick skulls, e.g. bulls, boars and large sows, to use a pistol which is designed to provide a high bolt velocity; simply
using a more powerful cartridge on some captive bolt pistols may not achieve this objective.

150. There are a large number of designs of captive bolt pistols in use and we have seen many of these. Pistols powered by compressed air rather than by cartridge are now being introduced into some slaughterhouses. The benefits of use are claimed to be relative quietness and speed of operation resulting from the absence of reloading time. These are usually suspended above the stunning box on a sprung counter-balance but do not appear to have been generally welcomed by slaughtermen, apparently on the grounds that they are heavy (about 12 lbs in weight) and unwieldy to operate (especially with one hand). We have seen such a system effectively used on calves in Holland but in conjunction with an automatic restrainer. In our view the system has much to commend it provided the head of the animal is restrained and the operator is positioned where he can use the equipment safely with both hands.

151. A variation on the captive bolt system is a concussion stunner which can also be powered by cartridges or compressed air and delivers a massive knock-out blow to the skull with a hammer-shaped head fitted to the bolt. It does not penetrate the skull. We formed the impression that it is not generally favoured because it is felt to be cumbersome to operate and more difficult to ensure an effective stun. Although not in common use commercially in this country, we have seen the system demonstrated on cattle. Our impression is that, properly positioned, the instrument gives an effective stun but is no better nor worse than the captive bolt method. The instrument could be cumbersome to handle, unless the animal’s head is fully restrained. Stunned animals showed considerable reflex movement in the initial period after ejection from the stunning box—which could create delays in shackling and bleeding—but appeared to be subject to an effective and long-lasting stun. Subsequent examination of the skull and brain tissue of some of the animals concerned indicated that the stun could cause a depressed skull fracture and considerable damage to the brain but reduction in the strength of the cartridge used could possibly reduce such damage. We understand development work is still being undertaken on concussion stunning pistols and we recognise the potential importance of this, particularly in relation to religious slaughter practices.

152. Yet another method of mechanical stunning is the use of a free bullet. Use of this system is now generally restricted to horses and obviously has drawbacks in terms of safety considerations. We have seen both the use of free bullets and captive bolts for stunning horses and considered both to be satisfactory—again provided that positioning of the weapon is correct.

153. Because of the period of time often taken to shackle, hang and bleed animals stunned by captive bolt methods, particularly larger cattle which have to be manoeuvred from the stunning box, it is essential that the stun should be effective and long lasting.

154. We recommend that operators of captive bolt pistols should be required to abide by manufacturers’ instructions on correct positioning of the pistol, weight of charge used and sharpness of the bolt (see para. 162).
CO₂ stunning of pigs

155. Specific provision is made in England and Wales for pigs to be stunned by ‘means of anaesthesia by carbon dioxide gas administered in an installation provided for that purpose’ (the Slaughter of Pigs (Anaesthesia) Regulations 1958). These Regulations set conditions for the construction and operation of the installations, which must be approved by the local authority, and put responsibility on the occupier of the slaughterhouse (or any person appointed by him) to ensure that the stunning operation is effectively carried out. In Scotland the use of CO₂ stunning could be provided for by regulations to be made under the provisions of the Slaughter of Animals (Scotland) Act 1980, but no such regulations have been made. The basic principle of CO₂ stunning is to install the pig in a chamber where it is subjected to a mixture of CO₂ and air (the prescribed concentration being 62–70 per cent CO₂ by volume). Each pig in the chamber must be held in a separate pen or compartment and exposed to the gas ‘for a time to render it insensible to pain until it is slaughtered’. Pigs emerging from the chamber should be in a relaxed, anaesthetised state which makes for easier shackling and sticking.

156. The system is mainly used in Denmark, with over 90 per cent of pigs being stunned in this way. Very few such installations exist in England and Wales. The high cost of installation, operation and maintenance and past problems with meat quality are said to be the main reasons for the lack of popularity here. Those systems which have been installed have generally been of the ‘oval’ design (i.e. where pigs pass through the gas concentration in an oval shaped tunnel on a conveyor system containing individual compartments). These have now largely disappeared from the Danish scene to be replaced by ‘compact’ plants (where each pig, securely held in a restrainer, is conveyed down into a gas tank and then elevated up out of the tank to be discharged for shackling). In addition to saving labour these plants are claimed to provide better restraint and to be more humane as well as reducing the levels of blood splash in the carcase.

157. Much research work has already been done (particularly in Holland and Denmark) and much has been written on the pros and cons of this stunning method. There appears to be no doubt that it provides a very effective stun but there are varying and strongly held views on the question of whether it creates unacceptable stress for the pigs during the onset of anaesthesia. Research observations of the pigs during the initial stages when they are first subjected to the gas have indicated that the pigs go through a violent excitation phase which can include panting, general agitation and convulsions. This excitation phase lasts for approximately 10–20 seconds but it is not clear whether the symptoms result from suffocation rather than the onset of anaesthetisation. Some findings suggest that although the excitation phase looks bad, it is doubtful whether the animals feel pain or are even conscious, and the phase is likened to an epileptic fit. The effect of the gas on the physiology of the pig, and whether anaesthesia results from the toxic effects of the gas, or from anoxia, are still areas where many questions remain to be answered. The wide range of views on the acceptibility of the technique is evidenced by the fact that
the method is banned completely in Holland but has widespread use in Denmark.

158. A major problem in assessing the technique is that, apart from special research operations, no-one can see in the normal commercial environment what actually happens to the pig from the moment it enters the installation until it subsequently emerges from it in a completely stunned state some 90 seconds later.

159. In the course of our review we have seen only one ‘oval’ plant in operation in this country but have seen a ‘compact’ plant being used in a large slaughterhouse in Denmark. Our experience of the system is therefore limited and we cannot comment substantively on the theory that the pig suffers considerable stress during the early stage of exposure to the gas. The plant which we saw in operation in Denmark certainly appeared to be highly efficient and effective, and, so far as we could judge, such a system would appear to have much to commend it. Such installations evidently need to be properly designed and maintained and it is important to ensure that the requirements on installation and operation, as set out in the Slaughter of Pigs (Anaesthesia) Regulations 1958, are complied with.

160. On the limited evidence we have we are not in a position to conclude that the system is either acceptable or unacceptable. Because of the unanswered questions, particularly relating to what happens to the animals in the early stages, we recommend that research should be actively pursued, possibly in conjunction with those European countries who have already been undertaking work on this.

General comments relating to all stunning equipment

161. Current legislation requires that all stunning instruments should be in proper repair. Whilst we fully endorse this provision, we are not satisfied from our investigations that this requirement is adequately enforced. In far too many cases, it was evident that equipment was neither being adequately maintained nor regularly checked to ensure its effective operation. We recommend a strengthening of the current legislation in this respect and suggest a requirement that in addition to daily checks by the slaughterhouse management (see paras. 88 and 132) all stunning equipment should be subject to monthly checks by slaughterhouse licensing authorities.

162. Current legislation does not provide that stunning equipment should be of an approved design. We consider that because effective stunning is such a vital area in relation to the welfare of the animal at slaughter, not only the stunning operator but also the equipment that he uses should be subject to approval and regular surveillance. We appreciate that approval of each individual stunning appliance may be impracticable, but we recommend that manufacturers of every type of stunning instrument for use in slaughterhouses in Great Britain should be required to meet criteria set, as a matter of urgency, in legislation; manufacturers should also be required to specify in the operating instructions, issued to all purchasers, and on the instruments
themselves, the correct positioning and, where applicable, correct stunning times and currents, etc., necessary for effective operation of the equipment concerned (paras. 1 to 8, 131, 133, 137 and 154 also refer).

163. Since any mechanically-operated equipment is subject to breakdown it is important that there should be an adequate back-up facility readily available. We therefore recommend that in all stunning operations a reserve stunning instrument of the captive bolt type must be readily available and maintained in good order ready for use in the event of a breakdown of the main system.

Pithing

164. The practice of pithing involves inserting a rod, usually a length of thick wire or cane, into the cavity made in the head by the captive bolt. This has the effect of destroying the lower portion of the brain and the upper spinal cord. The technique is used primarily as a safety measure for the slaughtermen in reducing the reflex action when the stunned animal is being shackled, hung and bled. Although violent convulsions can occur when a rod enters the skull and spinal canal, within a few seconds of application the reflexes generally die away.

165. The practice, used only on cattle, is not commonly used in England and Wales although it is widely used in Scotland and we have seen it in operation in the course of our visits. From purely hygiene considerations, the practice is not favoured. On animal welfare grounds, provided the animal has been effectively stunned, there is no evidence that the practice increases suffering; by hastening brain death there may well be advantages. In our view, there is insufficient evidence to recommend any change to the status quo.

SECTION 6

Sticking techniques and tenderising

Sticking techniques

166. We have already expressed our concern that once stunned, animals must be shackled, hung and bled with a minimum of delay. Not only is it essential to ensure that an animal is stuck before the effects of the stun wear off, but also that the bleeding out process should be properly carried out so that exsanguination and death occur within this period. (At Section 4/2 we have considered the question of the need for bleeding out.)

167. Although we have seen a few animals bled horizontally on cradles, the norm now is for most animals to be hung and bled in a vertical position. The object of sticking is to cut off the blood supply to the brain and it is critical
that to achieve this with the minimum of delay the cut must be accurate. We are not satisfied that slaughtermen are aware of this necessity.

168. We recommend that more guidance should be given in specifying correct sticking procedures and that in the licensing of slaughtermen (considered at Section 8) the licensing authority must ensure that correct sticking procedures have been understood and adopted. We were pleased to note that the MRI has issued detailed guidelines on the sticking of sheep and we recommend that similar guidelines for all species should be included in a Code of Practice.

169. We have seen veal calf slaughter where removal of the head immediately after stunning, shackling and hanging has been carried out rather than using the normal sticking technique. Whilst such a technique obviously ensures effective bleeding out and rapid death, we have doubts about recommending adoption of such a system while there remains uncertainty about the effectiveness of the stun and we understand that there are objections on hygiene grounds.

Tenderising techniques

170. In the course of our slaughterhouse visits we have seen various tenderising methods in operation—all used with the objective of improving meat quality. It was not within our remit to judge how effective these processes were in meeting that objective but we were obviously concerned to establish whether any of the techniques added to the stress or suffering of the animal at the time of slaughter. The techniques we have seen in operation are: low voltage electrical stimulation both at the post-stun, pre-sticking stage and at the post-sticking stage, high voltage stimulation of carcases and ante-mortem injection of an enzyme solution. There is no specific legislative provision relating to any of these techniques.

Electrical stimulation

171. The purpose of electrical stimulation (known by this term within the industry whether applied to the stunned or the dead animal) is to speed up the onset of rigor mortis to enable early chilling or freezing of the carcase to take place without creating a condition known as ‘cold shortening’ which can toughen the meat. High voltage stimulation of the carcase is not of relevance to our review, except that it evidently provides an acceptable (though costly) alternative method of meeting the objectives of other electrical stimulation techniques applied before the animal is dead.

172. Low voltage stimulation is generally achieved by attaching heavy duty clips to the lip or nose of the hoisted animal and passing the current through the animal at approximately 90 volts for 30–60 seconds. We have seen this method applied to cattle both at the stage when they have been stunned and hoisted and at the stage immediately after sticking. There is clear visual evidence of the application of the current with considerable and vigorous trembling of the muscles over the whole body. In the small number of
applications we have seen we were satisfied that, because stunning had been effectively carried out, there was no risk of the animal being sensitive or regaining sensitivity to the process. There are two areas, however, for concern: (a) that an ineffectively stunned animal might be caused further suffering by the use of this technique and (b) that by delaying the sticking of an animal for up to 60 seconds while the process is being applied post-stun, there is a greater risk that the effect of the initial stun might wear off and the animal therefore regain sensibility before death by exsanguination intervenes. To reduce this risk we therefore recommend that the use of electrical stimulation treatment should be permitted only on animals which have been both stunned and stuck.

**Tenderising by injection of the enzyme papain**

173. This process involves the intravenous injection of a preparation containing oxidised papain into prime beef animals immediately before the stunning and slaughter process. The preparation is thereby distributed through the blood stream to all parts of the animal before its death. Papain is a vegetable enzyme and the effect of its introduction, in solution, into the circulatory system of the animal is said to accelerate the breakdown of protein molecules in the meat, thereby tenderising it. We are advised that the preparation remains in an inactive state until it is subjected to temperatures of 40–50 °C by normal cooking processes of the meat. Supplies of the enzyme are drawn from the USA and the process is used only in a limited number of slaughterhouses in this country under licence granted by a single company.

174. Use of the technique has been demonstrated to us at two of the abattoirs operated by the company concerned. Immediately prior to slaughter the animal is driven into a crush and the head tied and pulled up in such a way that the neck is extended for presentation of the vein for the injection. Assessment of the dosage (which is based on weight of the animal) and the injection process is carried out by lay slaughterhouse staff who are given specific training in the technique. Immediately the solution has been injected the animal is released from the crush and moved forward into the approach race and stunning box for normal captive bolt stunning and slaughter. The normal period between completion of the injection and slaughter was said to be not more than five minutes. We were told that fractious animals were not subjected to the process. In one slaughterhouse one of the two animals seen resisted restraint of its head so violently that attempts to inject it had to be abandoned. We were also told that, if for any reason a treated animal could not be put through the slaughter line, it would be placed back in the lairage under observation and slaughtered the following day without being re-injected. It is said that the inactivated enzyme is quickly excreted by the kidneys of a live animal. We were told that the incidence of adverse reaction to the treatment was minimal (reported to be five animals out of 100 000). Incorrect dosage or incorrect composition of a solution can cause death.

175. The technique, as demonstrated to us, was generally carried out in an efficient manner and the slaughterhouse staff concerned were evidently well trained.
176. Our concern is with the principle of the whole process rather than with its method of application, i.e. whether it is an unnecessary interference to the animal which affects its welfare at the time of slaughter. There is also a possibility that tissue deterioration, although not common, can occur in treated animals with localised degeneration particularly of the liver and kidneys although we have been unable to trace published evidence to confirm this. We therefore consider there is a real risk that animals can suffer as a result of the process, particularly if subsequent slaughter has to be delayed. Nevertheless we have had to bear in mind that the process can be equated to many normal veterinary procedures. The fact remains, however, that such procedures are carried out in the interests of the animal’s health, which this is not. We have also been concerned that the operation is normally carried out by lay persons without veterinary supervision, although we understand that there is no contravention of the provisions of the Veterinary Surgeons Act 1966. Even though the operators seen by us were very capable there can obviously be no guarantee that that will always be the case.

177. We are aware that the technique can be likened to other husbandry practices which have the purpose of improving the quality of the end product, e.g. hormone implants. Our remit does not extend beyond slaughter practices but in any event we do not accept the view that, simply because one practice is permitted, a similar practice must therefore be acceptable and also permitted.

178. Although there is no evidence of extending the commercial use of the process to other species in this country or of introducing alternative products to achieve similar objectives, nevertheless with the development of biotechnology there is an obvious risk of similar techniques emerging which might have greater adverse effects on the animal.

179. We were interested to note that although there is no general EC ban on the use of the technique, the United Kingdom and Ireland are the only Member States which allow the process to be used (although we believe Belgium is considering allowing its introduction). In addition, meat so treated cannot be traded from one Member State to another unless both countries agree. We acknowledge, however, that such prohibitions have arisen more from human health considerations than from animal welfare interests.

180. So far as the consumer is concerned, there is a requirement for meat which has been subjected to such a process to be labelled ‘tenderised’ when displayed for sale (Food Labelling Regulations 1980). There is no requirement to specify how the ‘tenderising’ has been carried out.

181. We have carefully weighed up all these factors in considering this important issue. We again stress that, in this review, we are concerned only with animal welfare considerations and cannot judge the issue on commercial or public health considerations.

182. On purely ethical grounds we dislike the practice. In addition, we have concluded that on welfare grounds the practice is undesirable and is an unnecessary interference to the animal for a non-veterinary purpose which
can create additional stress and suffering for the animal at the time of slaughter. We therefore recommend that the technique should be banned and that such a ban should cover any process which involves the forcible administration of a preparation or drug to the animal within 24 hours of slaughter other than for therapeutic reasons.

SECTION 7

Casualty and emergency slaughter

183. In the course of our review, representation has been made to us that the current provisions for slaughter of casualty animals are both confusing and inadequate in relation to the welfare needs of the animals. We have concluded that the situation is indeed unsatisfactory.

184. The requirements of current legislation in England and Wales (mainly embodied in Regulation 19 of the Slaughterhouses (Hygiene) Regulations 1977) are open to misinterpretation and confusion. The undressed carcase of an animal slaughtered on the farm cannot be accepted at a slaughterhouse unless it is accompanied by a veterinary certificate (although in the case of a sheep or lamb the legislation does allow for a written declaration from the person who has charge of the animal to be substituted for a veterinary certificate). The certification or declaration required is intended to provide evidence to the slaughterhouse that the carcase is unlikely to have been rendered unfit for human consumption. In most cases therefore the owner of an animal slaughtered off the slaughterhouse premises can only dispose of that carcase at anything like normal market prices if he has obtained a veterinary certificate, and even then he is likely to have difficulty in finding a slaughterhouse which is prepared to take the carcase. An alternative is either to sell the carcase to a knacker (at a much lower price) or to transport the unfit animal live to the slaughterhouse to avoid the trouble (and cost) of a veterinary visit and to preserve the right of obtaining a reasonable price. Provided an unfit animal arriving at a slaughterhouse can be considered to have an 'injury of recent origin', a veterinary certificate is not required (Regulation 19 (1)(a) refers). If the injury or disease cannot be accepted as 'of recent origin' the live animal must be accompanied by a veterinary certificate. In our view, it is all too easy for no questions to be asked by the receiving slaughterhouse and for an injury (or ailment) to be assumed to be 'of recent origin'. Therefore, owners of unfit animals will often pursue the economically beneficial option of taking such animals live to the slaughterhouse, even though they might not be fit to travel, in which case there would be a contravention of the transit legislation (Section 11 of the Transit of Animals (Road and Rail) Order 1975 which prohibits the carriage of unfit animals ('unfit' being defined as 'infirm, diseased, ill, injured and fatigued')).
185. The form of certification required by slaughterhouses both for carcases of animals slaughtered on the farm and for unfit animals sent live (which cannot benefit from the ‘injury of recent origin’ exemption mentioned above) has simply to give details of the animal and its owner and an undertaking that it has not been affected by any disease or condition or received drugs which may render the carcase unfit for human consumption (Schedule 1 to the 1977 Regulations refers). In no respect does the certificate indicate whether a live animal is fit for transportation to a slaughterhouse.

186. It should be recorded that legislation on the slaughter of casualty animals in Scotland is different from that in England and Wales. Traditionally in Scotland ante-mortem inspections of all livestock entering a slaughterhouse have been undertaken as part of the meat inspection operation, with exceptions in remote areas; thus the Slaughterhouse Hygiene (Scotland) Regulations 1978 make no reference to the handling of casualty animals. A casualty animal is in fact defined in the Food (Meat Inspection) (Scotland) Regulations 1961 as an animal which is slaughtered elsewhere than in a slaughterhouse by reason of its having been affected by an accident, illness or other emergency which requires that it be slaughtered elsewhere than in the slaughterhouse. Thus in Scotland, ‘a casualty animal’ is in effect a carcase from an animal slaughtered outwith a slaughterhouse which can only be taken into a slaughterhouse when it is accompanied by a veterinary certificate which complies with the legal requirements. Because of the provisions for ante-mortem inspection at the slaughterhouse live animals which are injured or ailing do not require certificates unless there is a local by-law requiring one. It should also be noted that the Veterinary Meat Inspector can, after ante-mortem inspection, direct that the animal should not be slaughtered in the slaughterhouse. There is therefore no statutory requirement for sick animals to be accompanied by a veterinary certificate but this does not preclude slaughterhouse operators from demanding one and a voluntary certification scheme, as initiated by the Scottish BVA, operates in some parts of Scotland. As in England and Wales, such statutory requirements as exist are directed to meat hygiene considerations and do not provide for certification of the fitness of the animal to be taken to a slaughterhouse.

187. We are therefore concerned on two counts: first that animals which are unfit for travel are being subjected to transportation and, second, that such current provisions for certification as exist are related solely to public health needs and are not taking into account the welfare of the animal. Scottish provisions for ante-mortem inspection do not resolve these problems. Existing legislation, in particular the provisions of the Agriculture (Miscellaneous Provisions) Act 1968 relating to the welfare of animals on agricultural land, and the 1975 Transit Order (referred to in para. 184) should provide protection for unfit animals against unnecessary suffering before they reach the slaughterhouse. We are not convinced however that this is either fully understood by those concerned or that such provisions are adequately enforced in relation to animals going for slaughter. Nor have we much faith that a recommendation for better enforcement of the transit legislation will improve matters unless additional safeguards are introduced.
188. A necessary part of our proposals for dealing with the current problems is to categorise slaughter of sick or injured animals into two clear areas, 'emergency slaughter' and 'casualty slaughter'. ‘Emergency slaughter’ is defined as the situation where an animal is suffering from the sudden onset of a condition which causes acute pain, e.g. limb fractures, and must be slaughtered immediately. ‘Casualty slaughter’ we have defined as relating to those animals which are not in severe pain but which are, or have been, suffering from injury or disease which has resulted in a decision to dispose of them as casualty animals. In both cases it is essential that the animal is not subjected to further suffering and, particularly for 'emergency slaughter', that it is slaughtered with the minimum of delay.

189. For this reason we consider that no 'emergency slaughter' animals should be moved off the farm and subjected to transportation to the slaughterhouse. We therefore recommend that such animals must be humanely put down at the place where they are injured or found to be in acute pain, except in those circumstances where they would be caused greater suffering or are at greater risk by virtue of not being moved. It would be for the person who has charge of the animal to decide whether the circumstances required the attendance of a veterinary surgeon and/or whether there was any scope for obtaining a return on the carcase, e.g. by finding a slaughterhouse that was prepared to accept a carcase certified by a veterinary surgeon, but the primary concern should be the welfare of the animal and not economic considerations.

190. ‘Casualty slaughter’ animals should be permitted to be taken to slaughterhouses but only if accompanied by a veterinary certificate. We are not satisfied that such forms of statutory veterinary certification as currently exist are appropriate for this purpose. We favour the form of certification introduced by the Scottish Branch of the BVA which provides for a veterinary undertaking that the animal is fit to travel to a specified slaughterhouse. We recommend that legislation should now be introduced which requires such form of certification to be mandatory for all casualty slaughter animals (i.e. cattle, sheep, pigs, horses and goats) which are over the age of two months and which are dispatched live for slaughter. Responsibility for provision of an acceptable certificate should be with the livestock owner. The designated official responsible for welfare (see para. 17) should check that the requirement is being met and ensure that any breaches, both of the transit legislation and certification requirement, are drawn to the attention of the enforcement authority.

191. A further factor creating increasing welfare problems in the handling of casualty animals is the decrease in the number of slaughterhouses. This can often result in sick or injured animals being transported long distances when there are no local facilities for casualty slaughter. There can also be a problem where the nearest slaughterhouse does not provide a casualty service or cannot be contacted out of normal working hours or during a weekend. We appreciate that slaughterhouses wish to discourage livestock owners from turning up at the slaughterhouse ‘on spec’ with an animal for casualty slaughter, often outside normal working hours. Nevertheless to accommodate such eventualities we recommend that all slaughterhouses should be required to
display in a prominent position the telephone number of a contact for casualty slaughter outside normal working hours. We further suggest that such contacts should also be listed in the local telephone directory. We would welcome the development of on-farm slaughter services by slaughterhouse managements although we accept that the cost may well be a constraint which could discourage the livestock owner from taking advantage of such a service. Consideration should also be given to requiring local authorities to arrange for a slaughterhouse/slaughterhouses within their area to provide a casualty slaughter service seven days a week or, in the absence of such a slaughterhouse in their area, to make arrangements with a neighbouring authority.

192. Where a casualty animal is to be transported to the slaughterhouse, it is essential that once there it is handled humanely and slaughtered with the minimum of delay. We are not satisfied that this is always the situation. In the course of our visits we have seen injured animals manhandled off transporters even though they were obviously suffering considerable pain and discomfort. Much more use should be made of trolleys to move unfit smaller species and slaughterhouses should be required by law to have such equipment for use. Although at many premises we were told that facilities existed for winching carcasses off transporters, we have considerable doubts that such facilities are regularly, if ever, used. We recommend that all slaughterhouses should not only be required to have facilities for slaughtering on the transporters but should also be required to use them in appropriate circumstances.

193. Casualty accommodation for sick or injured animals, particularly in export-approved slaughterhouses, was usually found to be good. Here again, there was little evidence of use. It is of obvious importance that such casualty facilities should be within easy access for unloading casualty animals and that animals can be slaughtered in them or have easy access to a slaughter area. Problems arise where the only facility for slaughter is on the normal slaughter line and this can result in delays in slaughtering a casualty animal because of the interruption it causes to the normal line operation. We are also aware that slaughter of animals in a casualty pen can similarly be delayed until men can be released from the slaughter line. Regulation 18 of the Slaughter of Animals (Prevention of Cruelty) Regulations 1958 requires slaughter of animals in pain without delay and, if necessary within the lairage. We recommend that this Regulation should be properly enforced. We also recommend that animals which are in pain or suffering must not be allowed to be retained in the slaughterhouse with the purpose of their recovering so as to improve the value of the carcase.

194. We are aware that the condition of an animal arriving for slaughter, whether consigned as casualty or not, can often be indicative of husbandry conditions on the farm of origin. Where there is reason to believe that the farm of origin is not giving proper consideration to the welfare of its livestock, the designated official responsible for welfare in the slaughterhouse (see para. 17) should advise the local Divisional Veterinary Officer of the Ministry of Agriculture, Fisheries and Food.

195. All our recommendations relating to casualty and emergency slaughter should apply to Scotland as well as to England and Wales.
SECTION 8

Licensing of slaughtermen

196. Current legislation (Section 39 of the Slaughterhouses Act 1974) requires that any person carrying out slaughter or stunning in a slaughterhouse or knacker's yard must be licensed by a local authority. Such a licence can only be granted to a person of 18 years of age or more who is, in the opinion of the local authority, a fit and proper person to hold a licence. The licences are in force for a period not exceeding one year and can be revoked during that period. The local authority is entitled to charge such fees as they consider appropriate for the granting and renewal of licences. Although the 1974 Act provides for the making of regulations for such matters as prescribing qualifications for licence holders, such regulations as have been introduced relate only to the need for any slaughtermen with less than three months (12 months in Scotland) experience to be granted a licence only on condition that he slaughters under the supervision of a slaughterman whose licence contains no such condition (Regulation 19 of the 1958 Regulations and Regulation 15 of the equivalent 1955 Scottish Regulations).

197. There appears to be no uniformity of standards in the granting of licences to slaughtermen nor is there evidence of any clear guidelines issued to local authorities on the degree of their involvement and scrutiny in the consideration of licence applications. Our impression is therefore that the whole question of licensing of slaughtermen is very unclear with considerable variations in standards. (Inadequacies in the training of slaughtermen are considered at Section 9.)

198. There is no doubt that all persons carrying out stunning and slaughter should be licensed. We recommend that the issue of such licences should be dependent on clearly defined criteria relating both to the training and proven ability of the slaughtermen. We appreciate that the unsocial conditions of the slaughterman's job already impose constraints on the recruitment of staff of the right calibre and that the imposition of further constraints in relation to qualifications may add to recruitment difficulties. Nevertheless, the ability of the slaughtermen in stunning and slaughtering an animal are prime factors in the welfare of animals at slaughter and we lay great stress on the need to ensure that efficiency must be maintained at all costs.

199. In no circumstances should full licences be issued to slaughtermen with no previous experience or without the approval of a suitably qualified or experienced local authority official who should be required to observe the slaughterman concerned operating stunning and slaughter equipment on all the species for which his licence is required. The licence should be in the form prescribed in legislation (at present it appears to be up to each local authority to produce its own format) and should clearly specify the stunning and slaughter methods which it covers and the species concerned. It should also certify that new applicants have undergone a period of supervised training. For trainee slaughtermen, rather than the current provisions for a full licence
to be issued subject to a supervision requirement for the first three months (12 months in Scotland), we recommend that a form of provisional licensing should be introduced which would allow the trainee to operate, only under supervision, for a prescribed period. At the end of such a period the trainee would be required to undergo a practical examination as required for a full licence.

200. Licences are currently issued for no more than one year. Representations have been made from the industry and from slaughtermen that the period of validity should be extended. This is mainly on the grounds of costs of renewal to the slaughtermen (who generally have to pay the fee set by the local authority themselves) and on the basis that annual renewal places a burden on the local authority and can also under-value the renewal process which can become automatic rubber stamping. Whilst we recognise that these factors exist we are not convinced that they provide sufficient justification for extending the current period of validity of licences.

SECTION 9

Management, supervision and training

201. Throughout this report we have made frequent reference to the need for understanding and care in the handling of animals and for efficiency, particularly in the stunning and slaughter operation. The response of slaughterhouse staff to the welfare needs of animals in their charge is of critical importance in the whole slaughter operation. We acknowledge constraints resulting from human frailties and the difficulties in attracting the right kind of staff to such work but, nevertheless, we have been very concerned in the course of our review and visits at the general lack of supervision and also at the standard of training of slaughterhouse staff. As in any situation there are always exceptions and we should record that we have been full of admiration in some slaughterhouses for the obvious care and understanding shown by management and staff for the well-being of the stock which they are handling.

202. Good management includes a responsibility for ensuring that full account is taken within the slaughterhouse of the welfare needs of all animals. It has been difficult to determine how much management involvement there needs to be, but there certainly appears to be a need for greater interest and more involvement by managers, particularly in the larger slaughterhouses (although we have been aware of some notable exceptions which we commend). Very often, and in the current economic climate perhaps understandably, too much consideration is being given to throughput levels with disregard for the welfare of the animal.
203. In addition, it is very rare to find any allocation of responsibility within the slaughterhouse for welfare or any indication that slaughter staff are specifically trained in animal behaviour and needs. We were aware that although some slaughtermen had a sense of caring and concern for the animals in their charge, they had little understanding of the needs of the animals they were handling and had evidently been given no formal training other than purely mechanical instructions on the operation of the equipment they were handling and even that often left much to be desired.

204. We believe that slaughterhouse managements should therefore become more involved and take a greater interest in the welfare of stock handled in their premises and in the training and scrutiny of staff working on the whole slaughter operation. Supervisors should be particularly aware of the danger of slaughtermen becoming so inured to the killing process that consideration of the animal is forgotten. We recommend that specific responsibility for animal welfare should be allocated to a nominated member of staff of at least supervisory level. (Enforcement responsibility is considered at paras. 15–20.)

205. The training of slaughtermen leaves much to be desired. Throughout our report we have indicated a lack of understanding and knowledge, particularly in relation to stunning equipment. Whilst we cannot expect slaughtermen to have scientific knowledge of such matters as animal physiology and the technical workings and effects of electrical stunning etc., nevertheless we consider that much more information should be given to them in the course of their training in relation to both the needs of the animals they are handling and the operation and effect of the equipment they are using. All too often current training practice is merely to introduce the trainee directly on to the slaughter line working alongside a colleague who has acquired his knowledge on the same basis, i.e. with no external or specialist training and perpetuating the faults of others.

206. We have been told of attempts to introduce an apprenticeship scheme for slaughtermen but with little apparent success or general adoption in the industry. We suggest that such a scheme should be given further consideration and that the possibility of day-release training should be pursued. We have recommended at para. 199 that the issue of licences should be dependent upon certification that a training period has been completed.

207. We have been concerned to find that the practice of payment of slaughter staff on a piece-work basis is fairly common. We consider that such a practice is not in the interests of the welfare of the individual animal but appreciate that it will be difficult to legislate against. Nevertheless we suggest that consideration be given to setting guidelines in the proposed Code of Practice on maximum throughput rates at the point of stunning and slaughter. Such limits would need to take account of the construction of the slaughterhouse, staffing levels and the equipment in use, factors which we appreciate would be difficult to establish, but we would like to see the feasibility of such guidelines pursued.
SECTION 10

Rabbit slaughter

208. Our remit covered the slaughter of rabbits and because legislative provisions and slaughter techniques differ from other species we wish to make specific reference to rabbits in this report.

209. The slaughterhouse licensing provisions of Part I of the 1974 Slaughterhouses Act apply to all species (except birds and fish) whose flesh is intended for sale for human consumption and, therefore, cover commercial rabbit slaughterhouses. In Scotland the Slaughter of Animals (Scotland) Act 1980 does not cover rabbits and there are therefore no 'registered' rabbit slaughterhouses. The stunning, slaughter and welfare provisions of these Acts (and the relevant Prevention of Cruelty Regulations) do not cover rabbits. The species therefore has no specific welfare protection at slaughter, except under the general protection of animals legislation.

210. We have seen commercial rabbit slaughter in the course of our visits and, on the whole, have been impressed with the efficiency of the operation. The commonly used method of stunning is to deliver a sharp blow to the back of the head - often with the back of a knife or a stout stick. Though crude and possibly distasteful to some, this method when seen by us was very effective, albeit in skilled hands. A high proportion of the carcass heads subsequently examined by us revealed considerable damage to the skull and brain tissue and, in our view, many of these animals would not only have been very effectively stunned but also killed by the blow.

211. Electrical stunning systems are also in use (particularly, we understand, where the meat is for export) and appear to give an effective stun if properly applied. Because of the ease of handling rabbits their progress through the slaughter process, i.e. from removal from the crates through to eventual bleeding out, is generally carried out in a relatively confined space and is quickly accomplished. It is therefore essential to ensure that with electrical stunning the progress to sticking is not too quick and that the animal is fully stunned before it is stuck, i.e. after an electroplectic fit has occurred.

212. Precautions are also necessary to ensure that rabbits awaiting slaughter are held in satisfactory conditions. Normal practice appears to be for rabbits to be delivered to the slaughterhouse in crates, usually for same day slaughter, and to be held in those crates which are eventually moved into the slaughterhall where rabbits are extracted for stunning and slaughter. It is therefore important to ensure that animals being held in crates are protected from adverse weather conditions and given adequate ventilation.

213. The length of time between the collection of rabbits and their eventual removal from the crates for slaughter can be considerable. In the rabbit slaughterhouses we have seen provision was made to cage the rabbits which, exceptionally, had to be held overnight. The impression we have is that such
accommodation is usually of a makeshift nature and does not take sufficient account of the needs of the animal. There is also no specific requirement that animals held overnight or for longer than a specified period should be fed and watered.

214. We recommend that legislation should be introduced which gives full protection to rabbits at slaughter (as is the case for other species). Such legislation should, in particular, take account of the specific points we have mentioned at paras. 208 to 213 above. In relation to stunning and slaughter methods, we suggest that provision should be made for stunning or instantaneous killing by the 'sharp blow' method we have referred to; it appears that the provisions of Part II, Section 36 of the 1974 Act (and Section 10 of the Slaughter of Animals (Scotland) Act 1980) if extended to rabbits would not as currently drafted allow other than a 'mechanically operated instrument' to be used for this purpose. In relation to accommodation standards for rabbits held on the slaughterhouse premises and to feeding and watering intervals we suggest that account should be taken of the Council's proposals in the Draft Code of Recommendations for the Welfare of Rabbits as submitted to Agriculture Ministers in November 1982.

Horse slaughter

215. The current slaughterhouse and relevant welfare legislation covers horses and also gives them added provisions relating to individual lairing, separation at slaughter and the keeping of records of all horses slaughtered. We have seen only a limited number of horses slaughtered in the course of our visits and have to say that those we have seen have been sympathetically and well handled. These have been individually handled in the approach races and stunning areas and it has been evident that, where animals are used to being haltered and led, they show less fear and appear to be less stressed. Our general findings and recommendations in this report can be taken to relate to horses as well as to other species more commonly found in slaughterhouses (see also paras. 113 and 152). Our recommendations at Section 4 for amending the prohibition rule on stunning within the sight of others should also be relevant to horses.

Goat slaughter

216. Few slaughterhouses handle goats. With the increasing interest in goat keeping there must undoubtedly be increasing numbers presented for slaughter and we would simply comment that our general recommendations relating to other species, particularly sheep, should also apply to goat slaughter.

Knackers' yards

217. The main provisions of the current slaughterhouse legislation and relevant welfare regulations relate to knackers' yards which are therefore
required to comply with similar conditions to those prescribed for slaughterhouses, e.g. on licensing of premises and slaughtermen, stunning requirements, etc. Our findings and recommendations in the body of this report will therefore relate in the main to knackers’ yards as well.

**On-farm slaughter**

218. The legislation referred to above does not extend to cover slaughter of animals on the farm either by a knacker or any other person, be it the farmer himself or someone engaged by him for that purpose. We realise that slaughter on the farm is likely to be carried out mainly on sick or severely injured animals. (Our comments on casualty and emergency slaughter are at Section 7.) There can also be on-farm slaughter, e.g. of pigs and sheep, where the meat is not intended for sale but for consumption by the owner and his family. Although animals slaughtered on the farm would be covered by the general provisions of the protection of animals legislation, and by the Agriculture (Miscellaneous Provisions) Act 1968, nevertheless we are concerned that there is no specific provision for humane slaughter practices to apply in such cases. We appreciate that enforcement of any relevant legislation would be difficult but would recommend that some provision is made for legislation to prescribe that animals slaughtered on the farm, for whatever purpose, should be humanely handled and killed instantaneously.
Part III – Summary of recommendations

Recommendations for legislation

1. At every slaughterhouse, the local authority to designate an official with formal responsibility for supervising compliance with welfare requirements. The official to be the Official Veterinary Surgeon where present, and an Environmental Health Officer (Veterinary Meat Inspector in Scotland) in other premises (paras. 16 and 17).

2. The designated official to be allowed time to carry out these duties and to be required to report breaches of welfare regulations, etc. to the Chief Environmental Health Officer (para. 17).

3. Officers of the State Veterinary Service should be required to visit all licensed slaughterhouses to check on compliance with welfare requirements on a regular basis and to report their findings to the Chief Environmental Health Officer (para. 18).

4. Annual licensing to be a requirement for all Scottish slaughterhouses (para. 26).

5. When considering applications for new slaughterhouse licences and for licence renewals, local authorities should be required to take account of advice from the State Veterinary Service (para. 26).

6. Purpose-built unloading bays must be provided when new slaughterhouse premises are being constructed (para. 31).

7. Animals held in lairages must have sufficient space to stand up, lie down and turn around (para. 45).

8. Regulation 7 of the Slaughter of Animals (Prevention of Cruelty) Regulations 1958, relating to frequency of feeding animals held in lairages, should be simplified and account also taken of the needs of individual species, the effects of travelling time, etc. (paras. 51 and 52. See also Recommendations 89 and 112).

9. The regulation requiring restraint of horned cattle when penned together should be reviewed (para. 54).
10. Existing legislation to be amended to permit the use of ‘Judas sheep’ in slaughterhouses (para. 65).

11. A general provision, on the lines of Section 4(2)(a) of the Transit of Animals (Road and Rail) Order 1975, for prohibiting excessive use of goads, etc., should be introduced for handling animals in the slaughterhouse (para. 66).

12. In the approach races and stunning areas the use of sticks or plastic piping to strike animals should be prohibited and the use of electric goads should be permitted only to the hindquarters of animals refusing to move forward (para. 66).

13. Legislation should clearly distinguish between the two stages of slaughter, i.e. stunning and sticking (para. 80).

14. The existing prohibition on slaughter of animals within the sight of others to be amended to relate to sticking only. Stunning within the sight of others to be allowed but only subject to specified safeguards. Scottish legislation to be brought into line with this (paras. 80 and 83).

15. A responsible member of the slaughterhouse staff to carry out checks, at least daily, that animals are being effectively stunned (para. 88).

16. Slaughter techniques which both stun and kill should be provided for within legislation (para. 93).

17. Animals should not be placed in a stunning box until the way is clear for them to be stunned, slaughtered and bled (para. 106).

18. Cattle stunning boxes be required to contain a head restraining device (para. 107).

19. Where a slaughterman is stunning and sticking a batch of animals single-handed, both operations must be completed consecutively for each animal (para. 120).

20. The shackling of animals should be prohibited while the animal remains on its feet (para. 121).

21. Legislation should specifically ban the hanging of animals before stunning (para. 121).

22. Electric tongs must not be used other than for stunning an animal (para. 128).

23. Manual electrical stunning systems must incorporate a warning light or buzzer to indicate necessary period of application (para. 131).

24. Electrical stunning systems must incorporate a fail-safe device to prevent operating with a lower than required current (para. 131).

25. Electrical stunning equipment should be subject to regular checks (para. 132).
26. Operators of electrical stunning systems should be required to abide by manufacturers’ guidelines on the correct voltage and current, correct time of application and correct positioning of electrodes (paras. 133 and 137).

27. Stunning of cattle in the poll position should be banned (para. 147).

28. Operators of captive bolt pistols should be required to abide by manufacturers’ instructions on the correct positioning of the pistol, weight of charge used and sharpness of the bolt (para. 154).

29. All stunning equipment should be subject to monthly checks by the slaughterhouse licensing authority (para. 161).

30. Manufacturers of all stunning equipment should be required to meet criteria set as a matter of urgency in legislation, and be required to specify in the operating instructions the correct positioning and, where applicable, correct stunning times and currents, etc. necessary for effective operation of the equipment concerned (para. 162).

31. A reserve stunning instrument of the captive bolt type must be readily available for use in the event of a breakdown of the main stunning system (para. 163).

32. Licensing authorities must ensure that correct sticking procedures have been understood and adopted by slaughtermen to whom licences are issued (para. 168).

33. The use of electrical stimulation treatment should be permitted only on animals which have been both stunned and stuck (para. 172).

34. Use of tenderising by injection of the enzyme papain should be banned, and such a ban should cover any process which involves the forcible administration of a preparation or drug within 24 hours of slaughter for other than therapeutic reasons (para. 182).

35. All emergency slaughter animals to be put down on the farm and not transported for slaughter (para. 189).

36. All casualty slaughter animals over the age of two months dispatched live for slaughter must be accompanied by a veterinary certificate which includes a declaration that the animal is fit to travel and specifies the slaughterhouse to which it is to be consigned (para. 190).

37. The designated official responsible for welfare should check that casualty slaughter requirements are being properly met and report any breaches to the enforcement authority (para. 190).

38. All slaughterhouses should be required to display the telephone number of a contact for casualty slaughter outside normal working hours (para. 191).

39. All slaughterhouses should have facilities for slaughtering animals on the transporters and be required to use them in appropriate circumstances (para. 192).
40. Slaughterhouses should be required to have trolleys for the movement of sick and injured smaller species (para. 192).

41. The slaughter of casualty animals which are in pain or suffering must not be delayed (para. 193 – see also Recommendation 62).

42. The designated official responsible for welfare in the slaughterhouse should be required to advise the local Divisional Veterinary Officer where there is reason to believe that proper consideration is not being given to welfare on the farm of origin (para. 194).

43. Full licences should not be issued to slaughtermen with no previous experience and provisional licences should be introduced to allow a trainee to operate only under supervision for a prescribed period (para. 199).

44. Full licences should be in a form prescribed by legislation, should specify the stunning and slaughter methods and species concerned and should certify that new licencees have undergone a period of supervised training (para. 199).

45. Before issuing a full licence, a suitably qualified or experienced local authority official should be required to observe the slaughterman operating the stunning and slaughter equipment concerned on all species for which his licence is required (para. 199).

46. Specific responsibility for animal welfare should be allocated to a nominated member of the slaughterhouse staff (para. 204).

47. Formalised training should be given to slaughtermen, particularly in relation to the needs of the animals and the operation of stunning and slaughter equipment (para. 205).

48. Rabbits at slaughter should be given the full protection of legislation enjoyed by other species (para. 214).

49. Such legislation should accommodate stunning or instantaneous killing by the ‘sharp blow’ method (para. 214).

50. In relation to lairing, feeding and watering, account should be taken of the recommendations contained in the Welfare Code for Rabbits (para. 214).

51. Animals slaughtered on the farm should be humanely handled and killed instantaneously (para. 218).

Recommendations for better enforcement

52. Local authorities to make more use of their enforcement powers (para. 19).

53. Agriculture Departments to take enforcement action if local authorities do not use their powers (para. 19).

54. Local authorities to be reminded of their enforcement responsibilities under the Transit of Animals (Road and Rail) Order 1975, particularly relating to lorry unloading facilities, non-slip surfaces, protection of animals awaiting
unloading and unloading without causing injury or unnecessary suffering (paras. 30, 32–34).

55. More account to be taken of the provisions of Regulation 11 of the Slaughterhouses (Hygiene) Regulations 1977 relating to the state of repair of non-slip floors and surfaces (para. 31).

56. There should be better enforcement of the provisions in the Slaughter of Animals (Prevention of Cruelty) Regulations 1958 relating to lairage accommodation and use (para. 40).

57. Drinking facilities in lairages should be subject to more regular checks (para. 50).

58. There is a need to ensure that food and feeding facilities provided in lairages are suitable (para. 53).

59. Animals laired away from the curtilage of the slaughterhouse should benefit from the surveillance provisions in the relevant legislation (para. 55).

60. There should be better enforcement of Section 36(1) of the Slaughterhouses Act 1974 and Regulation 16 of the Slaughter of Animals (Prevention of Cruelty) Regulations 1958 relating to stunning (para. 124).

61. There should be better enforcement of the provisions of the Agriculture (Miscellaneous Provisions) Act 1968 and the Transit of Animals (Road and Rail) Order 1975 in relation to handling and transportation of casualty animals (para. 187).

62. Regulation 18 of the Slaughter of Animals (Prevention of Cruelty) Regulations 1958, requiring slaughter of animals in pain without delay, should be properly enforced (para. 193).

Recommendations for proposed Code of Practice

63. Animals to be handled in a calm, unhurried manner (paras. 28 and 56).

64. More use should be made of hydraulic tail-lifts or adjustable unloading bays to accommodate unloading from multi-tier lorries (para. 30).

65. The use of guide boards for pigs is recommended (para. 34).

66. An experienced stockman should be responsible for handling livestock in the unloading and lairage areas (para. 35).

67. Slatted and mesh floors must be properly cleansed and maintained to avoid injury to the animals (para. 42).

68. There should be provision for adequate exchange of air facilities (paras. 47 and 48).

69. Lighting must be sufficient to allow for proper inspection of animals (para. 49).
70. Drinking facilities in lairages must be accessible for the species housed (para. 50).

71. Animals should not be held for lengthy periods in the approach races to the stunning areas (para. 57).

72. Metal gates, doors and fittings to be baffled against noise (paras. 58 and 109).

73. Animals must be securely penned in the lairage and no opportunities given for escape from the approach races (para. 62).

74. Facility to be provided for obtaining access to base of stunning box (para. 105).

75. The design of cattle stunning boxes should allow for animals to be evacuated and returned to the lairage (para. 106).

76. Moveable parts of cattle stunning boxes to be fitted with noise absorbent baffles (para. 109).

77. Cattle boxes to be designed to accommodate both large and small cattle with facility for stunning at different levels (para. 112).

78. Incorporation of a form of restraint in stunning pens for smaller species is favoured (para. 117).

79. Once stunned, animals should be shackled, hung and bled with a minimum of delay (para. 120).

80. Automatic restraining systems should contain facilities for evacuation of the animal (para. 122).

81. Diagrammatic advice on correct positioning of stunning equipment for individual species to be provided (para. 147).

82. Guidelines to be included on correct sticking procedures (para. 168).

83. Contacts for casualty slaughter should be shown in local telephone directories (para. 191).

84. Casualty slaughtering facilities should be within easy access of unloading areas (para. 193).

85. Slaughterhouse managements should be involved and take an interest in the welfare of stock handled in their premises and in the training and scrutiny of their staff (para. 204).

86. Information should be given to slaughterhouse staff in the course of their training, relating both to the needs of the animals and the operation and effect of the equipment they are using (para. 205 – see also Recommendation 47).

87. With electrical stunning of rabbits progress to sticking must not follow too rapidly (para. 211).
Recommendations for research

88. High priority to be given to allocating funds for research work (para. 21).
89. Effects of provision or deprivation of food prior to slaughter (para. 51).
90. 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 of pain (para. 89).
91. The use of alternative materials to reduce noise levels (para. 109).
92. Whether animals’ attention is attracted to a light source (para. 110).
93. Effectiveness of low-voltage stunning in rendering animals instantaneously insensible to pain (para. 135).
94. Effects of head to back stunning (para. 139).
95. Use of high frequency electrical stunning systems (para. 143).
96. Effect on animals, particularly during the early stages of application, of CO₂ stunning (para. 160).

Other recommendations

Design and construction

97. Unloading bays (para. 31).
98. Solid wall pens in lairages, particularly for pigs (para. 46).
100. Mobile end walls or gates to move animals down through pens (para. 46).
102. Use of water sprinklers (paras. 48 and 63).
103. Construction of approach races (para. 57).
104. Gradients of approach races (para. 59).
105. Lighting in approach races (para. 61).
106. Working environment (para. 103).
107. Design features for cattle stunning boxes (paras. 105 and 107 to 112).
108. Design features for stunning pens for smaller species (paras. 117 to 119).
109. Use of automatic restrainers (paras. 122 and 137).
110. Use of automatic stunning systems (para. 141).
General

111. More care needs to be taken in the designing of slaughterhouses (para. 23).

112. Consideration to be given to the introduction of a table, prescribing time limits within which animals must be fed in lairages (para. 52—see also Recommendation 8).

113. Advisory code to be considered for use as a plain man’s guide to use of electrical stunning systems (para. 144).

114. Consideration to be given to requiring local authorities to arrange for a slaughterhouse to provide a seven-day casualty slaughter service (para. 191).

115. Consideration be given to the development of an apprenticeship/day-release training scheme for slaughtermen (para. 206).

116. Consideration to be given to setting guidelines on maximum throughput rates at the point of slaughter and stunning (para. 207).

117. Relevant recommendations contained in the report to be related to knackers’ yards (para. 217).
A comprehensive review such as we have carried out and the preparation of a detailed report inevitably involve the participation and co-operation of a great many people. The individuals and organisations to whom our thanks are due are far too numerous to list but there are those who should have a special mention.

I am particularly grateful to the Members of the Council, especially to those of our Markets, Transport and Slaughter Committee, who freely gave of their time in undertaking this review which necessitated close observation of slaughter operations and involvement in an area of work in which many would be reluctant to participate.

My thanks are due to all who eased the way for our fact-finding visits, particularly to the slaughterhouse managements and staff who allowed us to observe their work and made us very welcome; also to the Environmental Health Officers, Official Veterinary Surgeons, Meat Inspectors and local officers of the State Veterinary Service who were generally present on our visits and contributed much useful information.

We also received considerable help from administrative and veterinary staff of the Ministry of Agriculture, Fisheries and Food and the Department of Agriculture for Scotland, who provided us with information and technical advice.

Finally we are very grateful to the staff of the Council’s Secretariat who have had the responsibility for organising and arranging all stages of this review and on whom much of the work of preparing the report has fallen.

R J Harrison
Chairman
Information on Farm Animal Welfare Council

The Farm Animal Welfare Council was set up in July 1979 by the Minister of Agriculture, Fisheries and Food and the Secretaries of State for Scotland and for Wales under the Chairmanship of Professor R J Harrison, Emeritus Professor of Anatomy, University of Cambridge. It has been given the responsibility of keeping under review the welfare of farm animals on agricultural land, at markets, in transit and at the place of slaughter. The Council advises Agriculture Ministers of any legislative or other changes that may be necessary and as an independent advisory body is free to publish any advice so given.

Members of the Council are appointed by Ministers and serve in a personal capacity.

They are:

Chairman:
Professor R J Harrison, FRS, MA, MD, DSc, MRCS, LRCP

Members:
Mr C B Atkinson, ARICS
Mrs M A S Bates, BSc (Agric)
Rev A L Birbeck, MA
Mr P L Brown, BSc, MRCVS
Mr S Burgess, FBIM
Mr J H Cullimore, JP
Professor J M M Cunningham, CBE, BSc (Agric), PhD, FRSE, FI Biol
Dr M S Dawkins, MA, D Phil
Mr R Ewbank, MVSc, MRCVS, FI Biol
Mrs R Harrison
Mr D L Haxby, MRCVS
Mr J A Inverarity
Professor J O L King, PhD, MVSc, BSc (Agric), FRCVS, FI Biol
Mr R MacPherson, MRCVS
Mr E T F Marsh, BEM
Dr D W B Sainsbury, MA, BSc, MRCVS
Mr P Staines  
Mr J G Thomas, BSc (Agric)  
Mr P A Walker, JP  
Professor A J F Webster, MA, Vet MB, PhD, MRCVS

Former members of the Council who also served during the period of the review were:
Dr A R Everton, LLM, PhD  
Mr H F C Hebeler, CBE, FRCVS  
Mr R J Hopkins  
Mrs G Knight  
Mr D G Llewellyn, BVSc, MRCVS  
Mr M Nicholson, MBE, MA, Dip Ag (Cantab)  
Mr C Platt

Farm Animal Welfare Council Secretariat  
Hook Rise South  
Tolworth, Surbiton  
Surrey  
KT6 7NF
Organisations which submitted written evidence

Animal Health Trust
Association of British Abattoir Owners Ltd
Association of County Councils
Bransby Home of Rest for Horses
British Horse Society
British Veterinary Association
British Veterinary Association (Scottish Branch)
Central Council of Societies in Scotland for Prevention of Cruelty to Animals
Compassion in World Farming
Convention of Scottish Local Authorities
Council of Justice to Animals and Humane Slaughter Association
Dartmoor Livestock Protection Society
Farm Animal Welfare Co-ordinating Executive
Federation of Fresh Meat Wholesalers
Meat and Livestock Commission
National Association of British Market Authorities
National Council of Women of Great Britain
National Farmers Union
National Farmers Union of Scotland
National Union of Agricultural and Allied Workers
Ponies of Britain
Royal College of Veterinary Surgeons
Royal Society for the Prevention of Cruelty to Animals
Trades Union Congress
Universities Federation for Animal Welfare

In addition, written submissions were received from over 100 members of the public (many of these related to religious slaughter practices only).
### Glossary of terms
(as used in the context of this report)

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Abattoir</td>
<td>see ‘slaughterhouse’.</td>
</tr>
<tr>
<td>Ante-mortem inspection</td>
<td>inspection of live animals in the slaughterhouse.</td>
</tr>
<tr>
<td>Anthropomorphic</td>
<td>attributing human responses and feelings to non-human beings.</td>
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<tr>
<td>Approach race</td>
<td>passageway between lairage and stunning area.</td>
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<tr>
<td>Bleeding/bleeding out</td>
<td>release of blood from the slaughtered animal (see paragraphs 90 and 91).</td>
</tr>
<tr>
<td>Blood splash</td>
<td>areas of haemorrhage into the muscles varying in size from pinpoint to a penny piece, especially in the muscles of the back and hind limbs; results from the rupture of microscopic blood vessels (see paragraph 136).</td>
</tr>
<tr>
<td>Captive bolt stunning</td>
<td>stunning by the use of a hand-held pistol to drive a bolt into the brain (see paragraph 145).</td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>cessation of the action of the heart.</td>
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<tr>
<td>Code of Practice</td>
<td>set of recommendations or guidelines of good practice which may have statutory backing.</td>
</tr>
<tr>
<td>Concussion stunning</td>
<td>stunning by means of a hammer-shaped head fitted to a captive bolt which does not penetrate the brain, but delivers a knock-out blow to the skull (see paragraph 151).</td>
</tr>
<tr>
<td>Corneal reflex</td>
<td>involuntary movement of the eyelids when the eye (cornea) is touched.</td>
</tr>
<tr>
<td>Curtilage (of slaughterhouse)</td>
<td>the area within which the slaughterhouse and its associated lairages and yards are situated.</td>
</tr>
<tr>
<td>Electrode</td>
<td>the positive or negative terminal which is used to conduct an electric current into the body.</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Eleptiform</td>
<td>electrical activity of the brain as in an epileptic fit.</td>
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<tr>
<td>Electroplectic fit</td>
<td>effect of electrical activity on the brain which causes convulsions, rigidity, etc. as in an epileptic fit (see paragraph 86).</td>
</tr>
<tr>
<td>Exsanguination</td>
<td>the loss of blood from the body (see paragraph 91).</td>
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<tr>
<td>Goad</td>
<td>a blunt or pointed stick, or battery-operated electric baton, used to urge animals to move.</td>
</tr>
<tr>
<td>Hanging</td>
<td>the suspension of a stunned animal, usually head downwards, so that it can be stuck and bled.</td>
</tr>
<tr>
<td>Knacker</td>
<td>a slaughterer or collector and processor of animals, the flesh of which is not intended for human consumption.</td>
</tr>
<tr>
<td>Knacker's yard</td>
<td>any premises licensed for the slaughtering and cutting up of animals whose flesh is not for human consumption.</td>
</tr>
<tr>
<td>Lairage</td>
<td>a place (a building or field) where livestock are kept while awaiting slaughter.</td>
</tr>
<tr>
<td>MAFF</td>
<td>Ministry of Agriculture, Fisheries and Food.</td>
</tr>
<tr>
<td>MAFF Circular</td>
<td>Guidance issued by Agriculture Departments to (in this case) local authorities on the interpretation of legislation for which they have an enforcement responsibility (see paragraph 126).</td>
</tr>
<tr>
<td>On-farm slaughter</td>
<td>slaughter of animals, which may or may not be for human consumption, on the farm premises.</td>
</tr>
<tr>
<td>OVS</td>
<td>Official Veterinary Surgeon - a veterinary surgeon designated by the Minister and appointed by a local authority, authorised to act in relation to the examination and health certification of meat intended for export.</td>
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<tr>
<td>pH</td>
<td>a measure of acidity or alkalinity.</td>
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<tr>
<td>Pithing</td>
<td>the insertion of a flexible rod through the hole made in the head by the entry of the captive bolt to destroy the hind part of the brain (see paragraph 164).</td>
</tr>
<tr>
<td>Poll position</td>
<td>a stunning position at the top or back of the head of the animal (see paragraph 147).</td>
</tr>
<tr>
<td>Race</td>
<td>a passageway along which livestock may be moved.</td>
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</tbody>
</table>
Reflex —

involuntary response to a stimulus.

Regulations —

subordinate legislation made under the authority of an Act of Parliament.

Restrainer (automatic) —

a conveyor which holds the animal and presents it for stunning (see paragraph 122).

Saline —

a solution of sodium chloride (common salt) which is a good conductor of electricity.

Shackling —

attaching fastenings (shackles) to the stunned animal (usually to the hind leg) by which it can be winched up and hung for sticking and bleeding.

Sinusoidal/square form —

wave forms of an electrical current, i.e. sinusoidal:

\[ \text{\includegraphics[width=0.2\textwidth]{sinusoidal.png}} \](see paragraph 142)

square form:

\[ \text{\includegraphics[width=0.2\textwidth]{square_form.png}} \](see paragraph 142)

Slaughter —

the killing of animals, especially for food. The process usually consists of stunning the animal to render it unconscious and insensible to pain, and then cutting the blood vessels in the neck so the animal bleeds to death.

Slaughterhall —

the part of the slaughterhouse in which animals are slaughtered and where carcases are prepared.

Slaughterhouse —

licensed premises where animals are slaughtered and carcases prepared for sale for human consumption.

Slaughter line —

a conveyor system (usually mechanised) for moving a carcase through the slaughterhall.

Spinal cord —

hind part of the central nervous system which is enclosed by the spinal column. It is a continuation of the hind part of the brain.

Sticking —

severing the major blood vessels in the neck or anterior to the heart by means of a knife.

Stimulus —

something which produces a response, e.g. a touch on the eye that causes the eyelids to blink.

Stunning —

rendering unconscious and insensible to pain, i.e. knocking out.
Supervene – to happen, as an interruption of another occurrence, e.g. death overtaking the need for the animal to remain stunned (see paragraph 94).

SVS – State Veterinary Service, whose responsibilities include control of animal disease, meat hygiene, animal welfare, etc. Veterinary officers are employed by the Ministry of Agriculture, Fisheries and Food.

Tenderising – methods of increasing the tenderness of meat by electrical, mechanical or chemical means (see paragraphs 170 et seq.).

Ventricular fibrillation – irregular fluttering or twitching of the ventricles (the two lower chambers of the heart).

Viscera – the integral organs of the body, especially the abdomen.
Recommended positions for captive bolt stunning

(See para. 147)
(Approximate position of the brain is shaded for pigs and sheep)

Cattle

Aim at the point where imaginary lines from eye to ear cross.

Bulls

Place the muzzle very firmly \( \frac{1}{2} \) in. (1 cm) to the side of the ridge which runs down the centre of the face (not illustrated).
Calves

Aim slightly lower than for adult cattle as the upper part of a calf’s brain is often undeveloped.

Pigs

Place the muzzle just above the level of the eyes. In all pigs aim well up into the head.

Boars

Muzzle must be placed to one side of the ridge which is in the mid-line of the skull.
In hornless sheep use the highest point of the head when it is held horizontally and aim towards the throat.

For horned sheep place the muzzle just behind the ridge which runs between the horns and aim towards the throat.

Goats

Horned and hornless - as for sheep. Kids - as for calves.
A bridle, head collar or halter should be fitted on the animal. Place the muzzle well above the eyes, as the brain is in the upper part of the head, and fire in the direction of the arrow. Failures are mainly due to aiming too low.
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