

CHAPTER 9

BROILER CHICKENS

9.1 Modern large-scale integrated broiler chicken production had its beginning on the outskirts of Sydney in the 1950s. The industry has grown significantly since then with very large increases in production controlled by relatively few commercial enterprises.

9.2 Chicken meat (broiler) production is located relatively close to areas of consumption. Besides the main areas around the capital cities there is substantial broiler production around Tamworth and Newcastle in New South Wales, Geelong in Victoria and Murray Bridge in South Australia. Location is determined mainly by the economics of transport in relation to markets, feed and processing facilities.

9.3 Most commercial enterprises are intensive, highly mechanised units which occupy relatively small areas compared to conventional farming. Broilers are run at high density on litter floors in houses ranging from open, naturally ventilated structures in the warmer climates, to fully enclosed controlled environment houses in colder climates.

9.4 The chicken meat industry provides a good example of modern agribusiness. The chicken industry operates largely through vertical integration with company ownership of breeding farms, multiplication farms, hatcheries, feed mills, some broiler growing farms and processing.

9.5 Two large companies - the Ingham Group of companies and Australian Poultry Ltd. - are responsible for between 75 and 80 per cent of the meat chickens produced in Australia.¹ A typical farm would have 60 000 broiler chickens and produce 200 000 to 300 000 birds a year.²

9.6 A number of welfare issues involving the meat chicken industry were raised during the inquiry. These included:

- aspects of the housing system, including stocking densities and the condition of the litter used in sheds;
- handling and transportation of broilers;
- processing operations; and
- health problems of broilers, including leg weakness and other deformities of the skeletal structure, respiratory disease and skin damage.

Housing Systems

9.7 More than 90 per cent of commercial meat chickens in Australia are reared in large fully intensive deep litter houses equipped with some degree of environmental control. The houses also provide for automatic feeding, watering and lighting systems.³

9.8 The sheds are either open sided or controlled environment. With open sided sheds, heat is maintained during the early growing phase by mechanical heaters, insulation and by side wall shutters or blinds. The sheds are naturally lit during daylight hours, and through wired mesh sides, are open to the environment. In controlled environment shedding, ventilation and lighting are mechanically controlled. The Australian industry houses about 60 per cent of its birds in open-sided sheds. In all shed types, maximum use is made of equipment to maintain the birds within the thermal comfort zone for their age. Such equipment includes fans, foggers and roof sprinklers. Additionally, sheds are insulated and often painted to assist in temperature control.⁴

Stocking Densities

9.9 The maximum stocking density for broilers raised on deep litter recommended by the Model Code of Practice for the Domestic Fowl is 40 kilograms per square metre - this stocking density relates to fully grown birds.⁵ Several contributors to the inquiry argued that this stocking density was excessive, leads to 'crowding', and leaves little space for the chickens to dust bathe and scratch in the litter.

9.10 ANZFAS in its submission argued that the maximum stocking densities were inadequate. They pointed out that:

... if birds are of a marketable 2 kg weight, 20 birds may be kept per square metre. At this stocking density, each bird would have a space allowance of only 500 sq cm; an A4 page is about 630 sq cm. Only when there are 16 chickens per square metre do they have the luxury of a space allowance equivalent to an A4 page! It should be noted that the minimum space allowance recommended by the Code is in reality even lower than 500 sq cm because it includes the area occupied by feeding and watering equipment.⁶

9.11 ANZFAS recommended that the stocking density in sheds be reduced to 0.28 square metre/2 kilograms, that is, no more than four birds per square metre at market weight.⁷

9.12 Dr Fairbrother of the Australian Poultry Industries Association (APIA), conceded that at a maximum density of 40 kilograms per square metre the birds 'are fairly close together, even though they can still move around a shed'.⁸ Mr Bell of the AVA also argued that stocking densities of broilers on deep litter is an area that can be a problem especially as the birds grow older and increase in size.

9.13 Mr Bell argued that:

As long as people do not exceed the recommendations included in codes of practice then we believe that the welfare of the birds is reasonably well looked after. There is,

however, an economic incentive at times to increase stocking density and overcrowd the birds and from time to time you will get a situation where processing is delayed and birds may grow on for another few days, and again overcrowding can occur.⁹

9.14 Dr Fairbrother of APIA told the Committee that while:

Stocking densities are designed to provide adequate space for birds to move, but also for economic reasons it is necessary to consider overall shed size and numbers of birds in a batch. When we talk of density of, say, 40 kilos per square metre, as in the recommended code of practice, this is related to fully grown birds at the time of picking up. It is a maximum density and, of course, can be varied downward if environmental conditions warrant such a change.¹⁰

9.15 The tendency to overcrowd broiler chickens to increase productivity, based on how much can be produced per square metre of floor space, may need to be reconsidered in the light of recent research findings. Studies have found that crowding stress, due to high stocking densities, leads to a reduction in body weight and an adverse affect on carcass quality.¹¹

9.16 Another consequence of housing large numbers of birds together is that the reactions of one or two birds can be magnified abnormally to create mass hysteria in the broiler shed. A sudden disturbance can create mass panic, leading to the crushing or suffocation of many birds confined in a relatively small area.¹² However, Dr Murphy, a poultry researcher, indicated to the Committee that she had seen little evidence of smothering. She added:

I know it is something that is talked about a lot as a meat chicken thing to do, but I have never come across it or heard of it. I think I can honestly say that, and I work closely with meat chicken producers all the time.¹³

9.17 Some researchers have also suggested that in addition to providing broiler chickens with more floor space a more varied and stimulating environment should be provided. Perches may make the birds less skittish, since birds that cannot get off the ground to roost may be more nervous. This might also reduce the incidence of breast blisters. Also, providing low upright floor panels with specific marks at intervals may help the birds form smaller stable groups and have a sense of place. Such visual 'placers' could also help in moving chicks out to fill the shed as they mature as chicks raised next to familiar objects will tend to follow and stay close to these objects.¹⁴

9.18 The Committee received insufficient evidence to determine whether the current stocking densities laid down in the Code of Practice are adequate. The Committee was, however, concerned that some crowding may occur in the period immediately prior to the broiler chickens being transported to processing plants. Accordingly, the Committee recommends that the maximum stocking densities for broilers in sheds be set at a rate consistent with the live-weight of the birds immediately prior to processing to ensure that overcrowding does not occur.

9.19 The Committee also believes there is a need for regular revisions of the stocking densities to take account of current industry practices and developments in the understanding of animal physiology and behaviour. The Committee therefore recommends that the stocking densities for broiler chickens be regularly reviewed by the Sub-Committee on Animal Welfare of the Australian Health Committee within the Australian Agricultural Council.

Litter flooring

9.20 Concern was raised during the inquiry regarding the possibility of contamination of the litter in broiler sheds.

9.21 As the birds will eat some litter, the base material must be free of contaminants that could be absorbed into the edible tissues of the chicken. For the same reason, litter materials should also be free of other substances - including chemicals, disease organisms and moulds - that may damage the birds' health. A number of materials are used as litter in sheds including wood shavings, sawdust, rice hulls or shredded paper. The litter is usually spread to a depth of 2-8 cm over the earth floor of the poultry house.

9.22 Dr Fairbrother of APIA informed the Committee that in past years there had been a problem with contaminated sawdust or wood shavings that was used as litter in some sheds.¹⁵

9.23 Dr Ryan of APIA told the Committee that because of this their growers are not permitted to use wood shavings as litter because of the risk of the wood having been treated with pesticides.¹⁶

9.24 In a publication of the NSW Department of Agriculture it was stated that timber by-products are acceptable for use as poultry litter only if they have come from untreated timbers. To avoid the risk of using contaminated by-products, some countries, including France, United Kingdom and Denmark now produce a softwood shaving specially for the intensive poultry industry.¹⁷

9.25 The litter used in broiler sheds needs to be absorbent, soaking up moisture from body wastes, while providing a dry, comfortable medium for the birds to dust themselves in and nest upon. It therefore needs to be capable of drying quickly and be soft and compressible, absorbent and buoyant. Rice hulls are being increasingly used as litter. Their size, freedom from dust, thermal conductivity, drying rate and compressibility make them a very suitable litter base. Performance trials conducted in 1970 by the University of Georgia showed rice hulls to be the best litter for growing broilers. Composted litter, which may be

produced by composting old broiler litter, is also a good litter material in all areas of the broiler shed except those used for brooding baby chickens, where complete freedom from ammonia is required.¹⁸

Alternative Housing Systems

9.26 The Committee also examined the alternative housing systems to deep litter housing including cage-rearing and free-range systems.

9.27 Each of these systems have a number of advantages and disadvantages. The NSW Department of Agriculture and Fisheries noted that meat chickens can be reared successfully in cages and this is now common in some parts of Europe and the Middle East. These systems are labour efficient; reduce the cost per bird of controlling the environment; eliminate the need for some preventative medication; reduce the incidence of groundborne diseases; and make harvesting easier and less stressful for the birds. However the system is costly to install and may be opposed by some consumers. For these reasons they have not been introduced to any extent in Australia to date.¹⁹

9.28 The Committee does not favour this method of rearing broilers. It has argued extensively in relation to cage rearing of layers that these systems have undesirable welfare aspects. Studies of cage-rearing systems in the United States have confirmed this. In studies of cage-reared and floor-reared broilers, researchers have found a greater incidence of breast blisters and weak or deformed legs and bone breakage in caged-reared birds.²⁰

9.29 Meat chickens are also reared on free-range in Australia but only on a small scale to meet a specialised niche in the market. The NSW Department of Agriculture and Fisheries argued that because of the areas of land involved and the need to regulate the environment of the chicken during its first three or four weeks of life, it is not feasible to rear large numbers of meat chickens on free range.

9.30 The current market demand for free-range chickens is also very small (less than 0.1 per cent) although the demand is increasing. Some small grower/processors are able to fill this niche in the market and obtain a premium sufficient to cover their extra production costs of between 50 cents to \$1.00 per chicken.²¹

9.31 As the meat chicken industry is almost totally dependent on large scale, specialised, intensive methods of production the NSW Department of Agriculture and Fisheries argued that there was no viable alternative to the deep litter system except cage rearing.²²

Handling and Transportation

9.32 Concern was also raised during the inquiry at the processes involved in the handling or 'picking up' of chickens and their transportation from the farm to the processing plant.

9.33 This operation needs to be done quickly and gently as rough handling of the birds is not only detrimental to their welfare and may cause considerable stress, but can also result in bruising. Bruised birds mean a downgrading of the product at the plant and can result in considerable financial loss for the processor.

Picking up Chickens

9.34 'Picking-up' of chickens usually takes place at night when the birds are relatively inactive and the temperatures cooler. This also helps reduce any stress on the birds. The birds are picked up by the legs and placed into crates which vary in size and material of construction. Although wire crates are still relatively common in Queensland, the majority of crates in use in Australia are a standard plastic crate specially produced in Australia for the local industry.

9.35 The Australian crates were designed so that they could be easily cleaned, ensure an adequate airflow and minimise any physical damage to the bird. Recently, the traditional coops have been replaced by crate modules handled by forklift trucks, resulting in considerable labour saving with less handling of the birds. Dr Fairbrother, however, acknowledged that there have been some problems with the crates recently with the birds' toes and feet being severed in some instances and abraded in other cases, although he said that the industry was now addressing the problem.²³

9.36 Alternative catching systems have also been examined by the industry. One system uses large plastic or metal crates which can hold about 25 chickens.

9.37 The latest in catching and pick-up equipment is the Tamdev 2000 automatic bird catcher from Northern Ireland. The machine resembles a combine harvester and operates by gathering the chickens from the shed floor and conveying them into transport modules.²⁴

9.38 The equipment has been shown to reduce downgrading to almost zero because chickens are not physically handled until they reach the processing plant. The equipment won a special welfare award in the United Kingdom in 1986.

9.39 Trials have been conducted in Australia since 1986 using this unit, and although the unit is performing satisfactorily in some situations, it is not used extensively by the industry. The company (Australian Poultry Ltd. in Queensland) that purchased the original machine has not purchased another.²⁵ One reason is that the equipment entails a large capital expense - each machine costing between \$250 000 and \$300 000. There are variations being developed on this machine in Europe and the United Kingdom and the industry is monitoring these developments.²⁶

9.40 NSW Department of Agriculture and Fisheries argued that the trend towards automatic or semi-automatic systems of harvesting chickens was desirable.²⁷ The Committee believes that such systems have many welfare benefits and encourages their further development.

Transportation

9.41 Unlike some other livestock industries, broiler chickens are not transported extremely long distances. Processing plants and farms have generally been located to keep the maximum distance birds have to be transported to between 50-100 kilometres from the processing plants.²⁸

9.42 The APIA argued that when transporting poultry every effort is made to protect the birds from excessively hot or cold conditions. This is achieved by the use of tarpaulins and a solid 'windbreak' at the rear of the truck's cabin. Birds are not transported when the temperature exceeds 40 degrees celsius.²⁹

9.43 However, the Committee received some evidence that there have been cases where broilers being transported to the processing plants have travelled in open trucks and sometimes are not adequately protected from the elements. Mr Miller of the Victorian Department of Agriculture and Rural Affairs told the Committee that where this had been brought to the Department's notice:

... appropriate veterinary officers have spoken to the companies that have been concerned. Also, I think there has been a program particularly to the major chicken meat companies, to make sure that their drivers are aware that when external temperature conditions are adverse they should properly tarp the vehicles. Going back a couple of years, I think the Department's attention was drawn to the fact that there were birds escaping from processing crates - this is broiler chickens and not laying hens - going to the processing works. Veterinary officers went and spoke to the companies at that time. Now I think the practice is to net vehicles to ensure that escapes do not occur.³⁰

9.44 The Committee was concerned with the problem of trucks breaking down on the way to processing plants. Dr Best of APIA, however, told the Committee that there were few instances of breakdowns.³¹ The Committee was also advised by Dr Kite that the larger companies, and many smaller companies, have the use of two-way radios when this occurs.³²

Processing of Broilers

9.45 When poultry are unloaded from crates used for their transportation, they are hung on shackles which convey them to an electrical stunner - a water bath through which passes an electrical current. The stunned birds then pass through an automatic killing machine that cuts the bird's jugular vein. Between the automatic killing machine and the scalding tank there is a worker stationed as a back-up killer to bleed-out any bird that may not have passed through the automatic system.

9.46 Welfare considerations are important in all these procedures. The birds must be handled carefully during uncrating and shackling. The stunning equipment and settings must be regularly checked and correctly operated to ensure that all birds are unconscious before slaughter. The Committee observed these operations at a processing plant in Sydney and was impressed by the efficient handling of the birds prior to slaughter and the manner in which the stunning and slaughtering operations were performed.

9.47 The Committee questioned the industry representatives as to most effective methods of slaughter. The APIA told the Committee that the electric stunner and automatic killer were the most humane method yet devised for the slaughter of poultry and that this method was both quick and efficient.³³ The Committee was told that in plants operated by integrated companies, commercial broiler chickens were all stunned before being

killed.³⁴ Mr Miller, of the Victorian Department of Agriculture and Rural Affairs, told the Committee that on the basis of his experience broilers were correctly stunned before death. He stated that:

Certainly with the most modern plants it is virtually impossible for the birds not to be stunned before they have their throats cut.³⁵

9.48 While the Committee, during its inspection of the processing plant in Sydney, did not observe any birds that had missed the stunner, it did receive evidence from Mr Bell of the AVA that this did occur from time to time.³⁶ As the Model Code of Practice for Livestock and Poultry at Slaughtering Establishments notes, ineffective stunning may occur for a number of reasons, such as:

- the voltage of the stunner is set too low;
- incorrect immersion of the bird in the water bath so that the current does not pass through the brain;
- failure of the stunner to operate at full efficiency or inefficient earthing of the shackle line;
- variations in the current;
- failure to adjust the height of the water bath to the size of bird being stunned;
- variation in the susceptibility of birds to electric shock;
- low frequency pulses;
- movement of the bird when entering the stunner so that it escapes contact with the water or does not make proper contact with it.³⁷

9.49 ANZFAS and others argued that the voltage of the stunner should be raised to a level where all the birds are killed to relieve any pain involved as raising the voltage in the water to a level that will kill some birds ensures the effective stunning of all birds. Dr Best of APIA however, explained to the Committee that research carried out on the practice of stunning birds to ensure they are killed indicated that they do not bleed as well. It was important in the final product that the birds, in a stunned state, bleed-out before they die.³⁸

9.50 Dr Gilchrist of the AVA also told the Committee that a number of smaller plants do not stun birds prior to slaughter. In some of these plants the birds are decapitated.³⁹ The Code of Practice notes that stunning is not necessary if poultry are killed by this method.⁴⁰

9.51 The Committee was concerned about the length of time it takes before death occurs after slaughter without stunning. Although it is difficult to determine when an animal becomes unconscious (that is, insensible to pain or other external stimuli), a number of studies have examined this question.

9.52 One study by Mr Carter of the CSIRO Division of Animal Health has examined slaughtering techniques in a number of animal species. His studies reveal that, immediately following slaughter of a conscious animal (by severing blood vessels in the neck or by decapitation), the animal remains aware of its surroundings and sensible to pain for at least 15 seconds.⁴¹

9.53 Dr Griffiths of the Animal Health Laboratory, Western Australian Department of Agriculture, has also conducted several studies on the effects of different stunning and slaughter procedures on chickens. From his observations, chickens remain conscious for 30-45 seconds after slaughter without stunning. Thereafter, cardiac arrhythmias start to occur and unconsciousness ensues due to loss of blood pressure to the brain. Death occurs due to circulatory collapse and cardiac arrest within 45-90 seconds.⁴²

9.54 The Australian Veterinary Poultry Association advised the Committee that on the basis of current research:

... following slaughter without stunning, chickens probably remain conscious for a variable period of up to one minute. In contrast, stunning results in a sharp and immediate decrease in brain activity, heart rate, respiratory rate and response to painful stimuli consistent with unconsciousness.⁴³

9.55 The Association noted that stunning prior to slaughter was clearly a more humane practice and endorsed effective stunning to render birds unconscious prior to slaughter.⁴⁴ The Committee concurs with these sentiments. The Committee considered whether the guidelines on the slaughter of poultry contained in the Code of Practice were satisfactory. On the basis of the evidence received, the Committee believes that they are, and that they should be followed by all poultry processors.

9.56 The Committee believes that all slaughtering practices should ensure a humane death and that as to the methods of slaughter, other than by decapitation, the Committee recommends that in all instances broiler chickens be stunned prior to slaughter in accordance with the guidelines laid down in the Codes of Practice for poultry at slaughtering establishments. The Committee further recommends that research be conducted into effective means of stunning in an effort to overcome the problems associated with the current methods.

Health Problems

9.57 A number of health problems associated with broiler chickens were identified during the course of the inquiry. These related to leg weakness and skeletal developmental problems, respiratory disease and various skin problems.

Leg Weakness

9.58 Leg weakness and related deformities of the skeletal structure was cited by a number of organisations and individuals who gave evidence to the Committee, including ANZFAS and Mr Roth of the NSW Department of Agriculture and Fisheries as a serious health problem in meat chickens. Mr Roth argued that it was a 'significant' problem and that 'every shed loses some birds from leg weakness'.⁴⁵

9.59 ANZFAS cited evidence that indicated that leg weakness and other deformities of the skeletal system were major causes of culling among meat chickens in Australia.⁴⁶ ANZFAS reported a study of 64 000 chickens in Western Australia which showed that 24 per cent of all deaths/culls were due to such problems.⁴⁷ A major cause of leg abnormalities has been identified as genetic and another cause has been recognised as the unnaturally fast rate of growth of broiler chickens which effect leg strength and formation.

9.60 ANZFAS cited several studies showing that few leg abnormalities occur when the growth rate of chickens is significantly slowed.⁴⁸ A number of studies have also investigated the effects of lighting on the activity of chickens and the incidence of leg abnormalities. Under intermittent lighting, chickens were found to be more active and had few leg abnormalities than chickens kept under continuous lighting. This pointed to the fact that lack of exercise has an important bearing on the problem.

9.61 However, not all the evidence received by the Committee supported the view that leg weakness and related problems were a serious problem. Dr Sheldon of the CSIRO argued that while leg weakness and other deformities were very common in the early days of the meat chicken industry there was a much lower incidence now due to genetic selection against the tendency.⁴⁹

9.62 The Committee notes that the APIA is conducting a research project into the problem of leg weakness at the University of Sydney and is sponsoring a project in Victoria with the Department of Agriculture and Rural Affairs.⁵⁰ The Committee supports these projects and encourages further research into the problem of leg weakness which it believes poses a significant health problem.

Respiratory Disease

9.63 Respiratory disease in broiler chickens has also been identified by ANZFAS and other welfare groups as a major problem. With large numbers of birds in an enclosed shed standing on the same litter for seven weeks, the quality of the air becomes a major problem especially with the decomposition of litter and a build up of faeces. This results in high levels of ammonia, dust and micro-organisms in the air.⁵¹

9.64 ANZFAS cited several studies that showed that both a build-up of ammonia and dust can have a damaging effect on the lungs of chickens. Although affected chickens may not show obvious signs of ill-health, they are likely to have increased susceptibility to disease and signs of lesions and infection on examination of the lungs.⁵² While improved insulation and ventilation design, plus better monitoring of moisture and ammonia levels, has improved the situation to some extent, respiratory disease still remains a problem for the industry.

Skin Damage

9.65 Skin damage was also cited as a significant health problem by ANZFAS. Given that litter in sheds deteriorates during the life of the chickens due to the accumulation and decomposition of faeces, broilers in contact with this litter may suffer various forms of skin damage. Initially, the foot pads may show signs of lesions or even ulceration and since chickens tend to spend more time sitting on the litter as they grow older, other parts of the body in contact with the litter, such as the breasts and the hocks, can develop blisters or burns.

9.66 Studies have indicated that the incidence of breast blisters in broilers is affected by age and body weight, stocking density, litter condition and sex - males, which have a slower rate of feathering are more frequently affected than females.⁵³

ANZFAS cited several studies to show that because the quality of litter in sheds is difficult to maintain, the feet, hocks and breasts of broilers are vulnerable to injury by contact with the litter, especially as the birds become less active.⁵⁴

9.67 In conclusion, the Committee notes with concern that broiler chickens are subject to several health and disease problems. The Committee notes that almost half of the research expenditure of the Chicken Meat Research Council in 1988-89 was devoted to research into improving the health status of broiler chickens.⁵⁵ The Committee encourages this research and believes further research should be undertaken into the health problems associated with broiler chicken production.

ENDNOTES

1. Evidence, Australian Poultry Industries Association, p. 8737.
2. National Farmers' Federation, Australian Agriculture, Vol. 2: 1989-90, NFF, 1989, p. 159.
3. Evidence, NSW Department of Agriculture and Fisheries, p. S8175.
4. Evidence, Australian Poultry Industries Association, pp. S8161-2.
5. *ibid.*, p. 8748.
6. Evidence, Australian and New Zealand Federation of Animal Societies, p. S8884.
7. *ibid.*, p. S8883.
8. Evidence, Australian Poultry Industries Association, p. 8748.
9. Evidence, Mr Bell, Australian Veterinary Association, p. 9365.
10. Evidence, Dr Fairbrother, Australian Poultry Industries Association, p. 8735.
11. One study reported the results of raising broilers at stocking densities of 929, 743, 557 and 372 square centimetres of floor space per bird, respectively. The study found a significant linear reduction in body weight and an adverse effect on carcass quality at the higher stocking densities. See M.W. Fox, Farm Animals, University Park Press, Baltimore, 1984, p. 32.

12. *ibid.*, p. 33.
13. Evidence, Dr Murphy, p. 9556.
14. Fox, *op. cit.*, p. 33.
15. Evidence, Dr Fairbrother, Australian Poultry Industries Association, p. 8754.
16. Evidence, Dr Ryan, Australian Poultry Industries Association, p. 8754.
17. NSW Department of Agriculture, Alternative Litter Materials for Poultry, Agfact A5.1.9, 1987.
18. *ibid.*, p. 3.
19. Evidence, NSW Department of Agriculture and Fisheries, p. S8176.
20. Fox, *op. cit.*, p. 32.
21. Evidence, NSW Department of Agriculture and Fisheries, p. S8175; and Australian Poultry Industries Association, p. 8739.
22. Evidence, NSW Department of Agriculture and Fisheries, p. S8176.
23. Evidence, Dr Fairbrother, Australian Poultry Industries Association, p. 8757.
24. Evidence, Australian Poultry Industries Association, p. S8165.
25. *ibid.*, p. 8735.
26. *ibid.*, p. 8756.

27. Evidence, NSW Department of Agriculture and Fisheries, p. 8767.
28. Evidence, Australian Poultry Industries Association, p. S8166; and NSW Department of Agriculture and Fisheries, p. 8769.
29. Evidence, Australian Poultry Industries Association, p. S8166.
30. Evidence, Mr Miller, Victorian Department of Agriculture and Rural Affairs, pp. 9411-9412.
31. Evidence, Dr Best, Australian Poultry Industries Association, p. 8758.
32. Information provided to the Committee by Dr Kite, Australian Poultry Industries Association, 7 June 1990.
33. Evidence, Australian Poultry Industries Association, pp. S8166-7.
34. Evidence, Mr Bell, Australian Veterinary Association, p. 9371.
35. Evidence, Mr Miller, Victorian Department of Agriculture and Rural Affairs, p. 9411.
36. Evidence, Mr Bell, Australian Veterinary Association, p. 9372.
37. Australian Agricultural Council, Sub-Committee on Animal Welfare, Model Code of Practice for the Welfare of Animals, No. 6 - Livestock and Poultry at Slaughtering Establishments, February 1987, pp. 14-15.
38. Evidence, Dr Best, Australian Poultry Industries Association, pp. 8759-61.

39. Evidence, Dr Gilchrist, Australian Veterinary Association, p. 9372.
40. Model Code of Practice, No. 6 (see footnote 37), p. 15.
41. Letter to the Committee from the Australian Veterinary Poultry Association, dated 27 September 1989, p. 2.
42. *ibid.*
43. *ibid.*, p. 2.
44. *ibid.*, p. 3.
45. Evidence, Mr Roth, NSW Department of Agriculture and Fisheries, p. 8791.
46. Evidence, Australian and New Zealand Federation of Animal Societies, p. S8892.
47. *ibid.*, pp. S8893-8894.
48. *ibid.*, p. S8895.
49. Evidence, Dr Sheldon, Australian Federation for the Welfare of Animals, p. 9530.
50. Evidence, Australian Poultry Industries Association, p. 8751.
51. Evidence, Australian and New Zealand Federation of Animal Societies, p. S8889. The Committee notes that ANZFAS recommends that layers have access to litter and therefore would presumably be subject to the same health problems identified by ANZFAS as detrimental to broiler chickens. See evidence, ANZFAS, p. S8834.
52. *ibid.*, p. S8891.

53. Fox, op. cit., p. 32.
54. Evidence, Australian and New Zealand Federation of Animal Societies, p. S8892.
55. Chicken Meat Research Council, Annual Report 1988-89, AGPS, Canberra, 1989, p. 7.