
PART TWO

THE DOMESTIC FOWL

CHAPTER 5

CAGE HOUSING OF LAYERS

5.1 The majority of layers in Australia are housed under a cage-layer system. More than 90 per cent of commercial laying hens in Australia are housed in this way. Under this system, several hens are usually housed together in a series of single-tiered cages. The cages are accommodated in special sheds featuring temperature controls such as ventilation units and fans and cooling or sprinkler systems. Hens have access to feed and water in their cages and are routinely inspected for general health and physical injury.¹

5.2 The other main commercial egg production method in Australia is the 'free range' system. This system allows birds to move freely inside and outside the housing facility that is provided, although they are generally shedded at night to protect against predators. A discussion of this system and other alternative housing systems is given in Chapter 6.

5.3 The Committee received widely divergent views on the appropriateness of the current cage housing system used in Australia. Some groups, such as RSPCA (Australia) and ANZFAS were opposed to the keeping of poultry in cages and have argued that the practice should be phased out.² Other witnesses, however, such as ACEP, AFWA and NSW Department of Agriculture and Fisheries argued that the present cage system in Australia provided numerous welfare benefits.³ Still other groups, such as the AVA, took a more neutral stance arguing that cages offer both advantages and disadvantages in terms of welfare.⁴

5.4 The Committee, on the basis of its inspections of several cage systems in a number of States was impressed by the modern facilities and standards of hygiene in these establishments. The Committee was able to see that the hens housed in these systems had ready access to the basic requirements of food and water. The birds also appeared to be in a good state of physical health. The sheds were clean, there were few flies and other insects and, the temperature control, and other environmental conditions appeared adequate.

5.5 The proponents of the cage housing system in Australia provided evidence to the Committee that the system offered numerous welfare benefits. The ACEP argued that the hens were protected from exposure to extremes of temperature and inclement weather, as well as from natural predators, such as hawks, foxes, feral dogs and cats. It was also argued that the hens are under close supervision and are routinely and easily inspected, allowing for immediate treatment or separation in the case of illness or physical injury.⁵

5.6 NSW Department of Agriculture and Fisheries argued in its submission that despite the relatively high stocking densities the incidence of disease was low among caged layers. This was due in part to the fact that the birds were not in contact with their faeces. The incidence of internal and external parasites was also lower than with hens housed on the ground.⁶

5.7 Regarding the incidence of external parasites in caged layers as compared with other systems, Mr Roth, of NSW Department of Agriculture and Fisheries, told the Committee:

I do not have any actual precise statistics that I could refer to, but I could guarantee that internal parasites are not a problem in caged birds. You do very occasionally get round worms and very occasionally you get tape worms, but they certainly are not a problem. ... But in the free-range birds the internal parasites can be a problem and probably would necessitate anthelmintics to get rid of them, and so they would be much more of a problem.

The external parasites would be more of a problem also in the free-range birds because again you have that earth-bird contact and a number of parasites, such as stickfast fleas, have a lava stage in the ground which just comes onto the birds and it is very very difficult to break it.⁷

5.8 The Committee questioned several witnesses on the use of antibiotics to control disease in cage laying flocks. Mr Holland, of the Australian Council of Egg Producers, told the Committee that:

I cannot remember the last time when I would have used antibiotics on my farm. It is certainly not a regular additive to feed. It would only be used in an outbreak of disease or some such thing, which is pretty rare in today's commercial flocks. I would suggest that there are far more antibiotics used in direct human consumption for all sorts of complaints than there is in the laying hen industry.⁸

5.9 Dr Kite, of the NSW Farmers Association, also told the Committee that antibiotics are only 'infrequently used'. She added:

In fact, the necessity for using medication of any sort is being reduced all the time because, I believe, the industry is basically becoming more efficient. The sorts of facilities and equipment that people are using are better. As we have been saying all along, in a cage system there is less opportunity for birds to pick up disease organisms, so there is less disease about generally and the whole disease status of the Australian flock would be improving all the time. And that means less requirement for medication of any sort.⁹

5.10 ACEP also told the Committee that the hens are subjected to minimal levels of social stress associated with fighting, pecking and bullying in cages. As hens in cages only have a limited number of flockmates within their immediate social hierarchy, they have consequently no difficulty in recognising their flockmates and remembering their social position in

relation to each other. A condition of social inertia results and there is no need for members to continually re-establish or recontest their social position once it has been initially established. Social stress is therefore kept to a minimum under these conditions. Hens kept in alternative systems where hens come into contact with many more flockmates have a far more complex social order (peck order) leading to frequent conflicts. Outbreaks of fighting, feather pecking and bullying are therefore far more common than in a cage system.¹⁰

5.11 The more stable social environment that hens in cages experience also means that they are subjected to less risk of physical injury being inflicted by flockmates. This, combined with a reduced risk of physical injury due to mechanical means, significantly reduces the opportunity for outbreaks of cannibalism, vent pecking and feather pecking. Cannibalism is a major problem in laying flocks housed in large groups on the floor or at range. In addition, the hens are protected from the risk of suffocation and physical injury resulting from mass panicking which can occur when large groups of birds are housed together, for example, on the floor or at range.¹¹

5.12 It was also pointed out to the Committee that such systems have many commercial advantages over alternative systems. NSW Department of Agriculture and Fisheries noted that laying cages are more cost effective to build and operate than other housing systems. The system is also labour efficient - one operator can effectively operate an automatic laying cage system with up to 20,000 laying hens (excluding egg packing). The working environment of a cage system also provides advantages for farm operators especially in respect to the inspection and handling of birds. For the farm operator there is also protection from the elements, freedom from obstructions, and from direct contact with the birds or their droppings.¹² The environmental conditions with hens housed at the optimal temperature (20° - 28°), means that hens eat less food and produce eggs that are 5-10 cents per dozen cheaper than is the case where the ventilation and temperature is unregulated.

5.13 These systems also provide consumers with eggs of high quality and of known age and freshness. NSW Department of Agriculture and Fisheries has commented that the quality of eggs produced by caged layers is at least equal to the achieved in other systems, but with less labour input. The eggs cool more quickly on the egg trays and fewer eggs are soiled and require washing. Egg handling is also reduced by automatic egg collection and on-farm packing systems.¹³ The only opportunities for spoilage came from incorrect storage and marketing.

5.14 Dr Kite also told the Committee that there was less risk of bacterial contamination of eggs from caged systems than other systems. She also suggested there was a greater risk of salmonella getting into non-caged produced eggs.¹⁴ Mr Miller, of the Victorian Department of Agriculture and Rural Affairs, told the Committee that only rarely was there a problem with chemical residues in caged eggs. He noted:

Very rarely there have been occasions where eggs have been detected above the maximum residue limit, but these cases have normally been due to operator error of a chemical contractor or something of that nature. They happen seldomly. If you try to compare what happens in an extensive system versus an intensive system in terms of residues; I guess it is more likely in keeping poultry in a range situation or on the floor that they are going to be prone to parasitism from external and internal parasites and some protozoan organisms as well.¹⁵

5.15 The question of yolk colouring as an indication of egg quality was also raised by the Committee. The Committee was told that the colour of the yolk does not reflect the quality of the egg. Fowls in free-range systems eating green grass and other natural plant food with pigmentation qualities produce eggs with dark yolks, while fowls fed on high protein grain mixes produce eggs with light yolks. Farmers provide food additives to darken yolk colouring in intensively produced eggs in response to consumer preference for eggs with dark yellow yolks. However, the colouring agents are natural food substances and not residual-producing chemicals.¹⁶

5.16 While the Committee received numerous arguments in favour of the current cage system, many welfare groups and individuals presented evidence to the Committee opposing the current system of intensive egg production.

5.17 ANZFAS in its submission to the Committee argued that the cage system did not provide for either the physical well-being of hens nor for their behavioural needs. The Federation argued that caged birds suffer a range of physical injuries including bone weakness through lack of exercise, injuries to the foot through constant contact with the wire mesh cage, and feather and skin damage due to pecking by other birds as well as abrasions and skin wounds caused by overcrowding.¹⁷ ANZFAS also argued that hens suffer behavioural deprivation in the cage environment. They asserted that caged hens are frustrated by their inability to engage in natural activities, such as laying their eggs in a nest, wing flapping, roosting off the ground, scratching and pecking the ground, and dustbathing. To compensate, birds often engage in displacement behaviour, in particular aggression and pacing, which in turn, often causes physical injury.¹⁸

5.18 Dr Wirth of RSPCA (Australia) also suggested to the Committee that the cage system did not ensure the welfare of fowls because the cage environment failed to meet several requirements. He suggested that confined animals, including fowls, needed to:

... perform some natural movement ... they should be able to stretch, to lie down, to turn around, to walk, and to flap wings. Secondly, there is a need to allow the formation of social groups, preferably by keeping together litter mates or those animals reared together with reference to segregation of breeds, sexes, size and temperament.¹⁹

5.19 Both the AVA and Dr Murphy, a poultry researcher, among others, argued that the present intensive system provides both welfare advantages and disadvantages. The AVA in evidence to the Committee suggested that there is no one ideal system. The

Association argued that cage systems have certain welfare advantages, including a cleaner environment for the birds, ready access to food and water and easier bird inspection and catching. However, they noted that the principal disadvantage of cages are that they 'limit bird movement and the expression of some normal behavioural activities such as nesting, perching and dust-bathing'.²⁰

5.20 Dr Murphy also emphasised that all housing systems had both good and bad welfare aspects. She argued that the welfare of an animal at any point in time comprised many components - both physical aspects (such as hunger, thirst, disease, injury, comfort and space, lack of noise, and light) and mental components, (such as fear, frustration, boredom, stress and deprivation). To assess the overall welfare status of an animal, or of a housing system, each one of these aspects needed to be measured and assessed.²¹

5.21 Dr Murphy further argued that many of the alleged negative welfare aspects of conventional cages involved the fact that cages restricted or prevented birds from performing certain behaviour patterns, often referred to as 'natural' behaviour. The question of when, why and if animals needed to behave in certain ways and what the consequences were if they could not was, she suggested, extremely complex. Dr Murphy also suggested that domestication and selection had changed behavioural traits, as well as physical and production traits - thus each behaviour needed to be examined separately. From a consideration of the many and varied individual aspects which combined to comprise an animal's overall welfare, Dr Murphy argued that it was obvious that no husbandry system had yet been devised which was positive in all respects - this is why housing systems could not be referred to as either good or bad but as comprising both good and bad welfare aspects.

5.22 Several specific aspects relating to the cage housing system were commented on during the inquiry. These included the adequacy of stocking densities, the extent of overstocking, and the need for improved cage design.

Stocking Densities

5.23 The adequacy of current stocking densities or stocking rates was a major concern during this inquiry. The Model Code of Practice for the Welfare of the Domestic Fowl lays down maximum recommended stocking densities for fowls in different systems of housing under good management conditions.²² (The Code is reproduced at Appendix 7 of this report).

5.24 The stocking densities for domestic fowls are shown in Table 5.1. As the table indicates the figures are expressed in terms of kilograms of liveweight per square metre of floor space. For caged layers the maximum recommended stocking rate in multi-bird cages, with three or more birds, is 52 kilograms per square metre. For cages with two fowls per cage it is 40 kilograms per square metre and for single fowl cages it is 26 kilograms per square metre. Single bird cages provide more space per bird than multi-bird cages. NSW Department of Agriculture and Fisheries also estimated the stocking densities for birds of different bodyweight. For example, in multi-bird cages, with three or more birds per cage for light, average and heavy birds the stocking density is approximately 370, 400 and 470 square centimetres per bird, respectively.²³ The stocking rate will also vary according to cage size and according to the average bodyweight of the particular strain of bird.

5.25 Some contributors to the inquiry, especially industry representatives, suggested that the present stocking densities were adequate. Mr Holland of the ACEP suggested that 'research that has been done around the world would indicate that the size of the cage that we are using is very close to the optimum' from both a welfare and production point of view.²⁴

Table 5.1: Maximum Recommended Stocking Densities
for Domestic Fowls in Cages

	Density (live-weight per unit of floor area)	Qualifications
Rearing of fowls for laying or breeding	40 kg/m ²	Relates to cage floor area.
Laying or breeding fowls (includes cockerels) 3 or more fowls per cage	52 kg/m ²	Density relates to cage floor area.
2 fowls per cage	40 kg/m ²	Irrespective of the number of birds per cage, each bird should have a minimum trough space of 10 cm.
Single fowl cages	26 kg/m ²	

SOURCE: Australian Bureau of Animal Health, Sub-Committee on Animal Welfare, Model Code of Practice for the Welfare of Animals: No. 2 - The Domestic Fowl, Canberra, 1983, Appendix 1.

5.26 However, witnesses including representatives of ANZFAS, Dr Murphy, Dr Wirth of RSPCA Australia and others argued that the current stocking densities were unacceptably high.²⁵ ANZFAS argued that while cages should be banned entirely over a five-year period, that in the interim period, the stocking density for hens should not exceed three birds per square metre.²⁶

5.27 It was argued that current stocking densities do not provide sufficient space for hens to lie down, turn around and engage in grooming behaviour, such as preening, head scratching, body-wing shaking and feather ruffling.²⁷ An assessment of space requirements is closely bound up with the concept of behavioural need, which remains a controversial subject. Some ethologists argue that the mere presence of a behaviour pattern in an animal's repertoire is sufficient evidence that the opportunity

and space to perform the behaviour must be provided. Others hold that behavioural patterns are such that animals can satisfactorily adapt even to an environment as barren and confining as a cage. These questions are complex, continue to be the subject of intense debate and have yet to be resolved.²⁸

Current Research into Space Requirements

5.28 The Committee examined the results of several major studies in Europe that are looking into the space requirements for birds in cages. Most of these studies have concluded that greater space allowances are necessary for the physical well-being of fowls.

5.29 A study by Zayan and Doyen in Belgium reported on the results of experiments over a nine-month period to test the effects of cage density on behavioural patterns in two strains of laying hens.²⁹ The study concluded that it was preferable to house birds in pairs rather than in larger groups. The study also recommended minimum floor space allowances for birds in pairs, based on observed behavioural patterns over a nine-month period. For light hybrid birds, such as White Leghorns, they recommend a minimum space requirement of 600 to 680 square centimetres per bird, and twice that for the pair. They argued that medium hybrids should be allowed between 760 and 800 square centimetres per bird in a pair, and if in cages of three or four birds, each bird required additional space.

5.30 A second group that is looking at space requirements is Dawkins and others in the United Kingdom.³⁰ This group has measured the amount of space hens use when performing common behaviour patterns such as standing still, turning around, stretching or flapping their wings. In the studies they placed a video camera above the hens and then analysed, by computer, the area the birds occupied.

5.31 In one study hens weighing 2.1 kilograms, on average were used. The study found that the hens occupied between 428 and 592 square centimetres when standing. They required between 978 and 1626 square centimetres to turn around, while flapping their wings occupied between 1085 and 2060 square centimetres. Even to preen their feathers the birds required more than 800 square centimetres.

5.32 While it is sometimes argued that hens can 'share each other's space' by protruding into the space allowance of other birds, because some birds occupy more than 450 square centimetres when they are merely standing still, there is little additional space to share. A bird may still be able to flap its wings by moving them above the heads and bodies of other hens in its cage, but contact with other birds and the sides of the cage is almost inevitable.

5.33 Another study by Dawkins and Hardie used Ross Brown hens for a similar experiment.³¹ The results of the study indicated that the hens used between 540 and 1006 cm² when turning, 653 to 1118 cm² when using flapping, 676 to 1604 cm² when feather ruffling, 814 to 1270 cm² when preening and 540 to 1005 cm² when ground scratching.

5.34 It is clear from these studies that the current European Commission Directive on space allowance for laying hens that requires that each bird be given a minimum space of 450 square centimetres does not allow sufficient opportunity for hens to perform a range of behaviour patterns such as preening, turning around or wing flapping.

5.35 The French group under Lagadic has conducted experiments in which birds are placed in cages which have movable walls which the hens can manipulate by pecking at a set of keys, the effect of which is to either increase or decrease the area of the cage.³² In the latest experiment eight groups of birds have been tested; two groups of birds have consistently increased their cage size to the maximum possible; two groups of birds have

consistently reduced their cage size to the minimum possible and four groups have varied their cage size in a random fashion. The results indicate that there may be considerable individual differences amongst hens regarding their preference for cage size. However, several other studies have consistently shown that battery-kept hens have shown a preference for larger rather than small cages.³³

5.36 Hughes, in summarising the current research into the space requirements of caged layers, has argued that:

... there is now convincing evidence available from a number of different sources that the amount of space available in a typical battery cage is too small. There is production response when hens are given more space, hens carrying out a limited range of basic activities cover an area greater than that which they are commonly offered, some of the behaviour patterns which they perform in more spacious environments require much more space than the battery cage can provide, and they show a preference for spaces much larger than those they are presently offered. Thus the evidence, fragmentary though it is, all points in the same direction. There may be economic arguments why no more space can be provided at present, but there is unquestionably a strong case for offering more space on welfare grounds. Although however, one may safely conclude that more space is desirable, the evidence is such that, at present, no particular figure can be confidently recommended as adequate.³⁴

Developments in Europe

5.37 An EEC regulation has recently laid down a uniform minimum cage size area for laying hens in battery cages.³⁵ Legislation became operative in several EEC countries on 1 January 1988 to implement the requirements of the 1986 EEC Directive for the protection of laying hens in battery cages. Member states of the Community are required to ensure that from 1 January 1988 for new or reconstructed cages, and from 1 January 1995 for all others, each cage shall provide a minimum cage floor area of 450 cm² per bird.

5.38 Some countries have, however, gone further and imposed additional regulations unilaterally. In the United Kingdom, higher minimum cage floor space allowances are required where there are less than four birds kept in a cage - 550 cm² per bird is required where there are three birds per cage, 750 cm² per bird for two birds per cage and 1000 cm² for cages containing one bird. In West Germany from 1 July 1989 each hen must have unrestricted use of at least 450 cm² of cage floor. If the average weight of the hens in the cage is more than two kilograms, each hen must have unrestricted use of at least 550 cm². In Denmark birds of up to three kilograms must have a minimum cage area of 600 cm² per bird (and 900 cm² for birds over three kilograms). Additionally, where only one bird is housed in a cage, the minimum cage area required is 1000 cm².

5.39 The United Kingdom, Danish and West German Governments have indicated that a more appropriate European standard for the minimum space allowance in battery cages should be about 600 cm² per bird, and these countries will be seeking improvements in this area when the review of the Directive takes place in 1993.³⁶

5.40 The Farm Animal Welfare Council in the United Kingdom, an independent body set up to advise the Minister of Agriculture, has recently criticised the European standard of 450 square centimetres as inadequate for the welfare of hens. The Council suggested that 600 square centimetres should be adopted as the minimum in Europe and that this minimum still needed to be increased progressively.³⁷ In this context, it should be noted that in the United Kingdom, the Ministry of Agriculture, Fisheries and Food recommended that each hen have 600 cm² of space prior to 1987, when it was reduced to 450 cm², to bring the United Kingdom into line with other EEC countries.

Conclusion

5.41 On the basis of evidence received during the inquiry, current research, overseas trends and the Committee's inspections, the Committee believes that caged layers should have more space than currently prescribed under the Code of Practice. The Committee therefore recommends that as an initial step the maximum stocking density for cages with three or more birds be reduced from 52 kilograms per square metre to 46 kilograms per square metre.

5.42 The Committee favours a shift away from the current practice of calculating floor space per hen by kilogram of live-weight per unit of floor area and recommends that in future, the space allowance for hens be expressed in terms of square centimetres of floor area per bird.

5.43 To give effect to the Committee's objective of addressing the need for further reductions in stocking densities for hens the Committee recommends the following reforms:

- (a) that each cage have a minimum area for each bird of:

- 1000 square centimetres where one hen is kept in a cage;

- 750 square centimetres where two hens are kept in a cage;

- 600 square centimetres where three or more hens are kept in a cage; and

- (b) that an early date of effect be introduced for new cages with a phasing-in period to apply for existing systems.

5.44 The Committee also believes that the stocking densities should be regularly reviewed to take account of advances in the understanding of animal physiology and behaviour, changes in husbandry systems and their relationship to the welfare of poultry. The Committee therefore recommends that the stocking densities for laying hens be regularly reviewed by the Sub-Committee on Animal Welfare of the Australian Health Committee within the Australian Agricultural Council.

Overstocking

5.45 The Committee during its inspections of several poultry establishments during the inquiry did not see evidence of overstocking. It did, however, receive some evidence of overstocking from several witnesses. As noted by the AVA, overstocking is detrimental to welfare. It can result in some birds being deprived of adequate food and water, underventilation, increased spread of infectious diseases, and increased social stress within the flock. Flock performance (such as egg production, and growth rate), may also be reduced if the optimal stocking rate for a facility is exceeded.³⁸

5.46 Professor Singer cited an example of a poultry farm in Victoria where the number of birds per cage far exceeded the stocking rate recommended in the Code of Practice. In the example cited, Professor Singer argued that:

... [the] cage ... measured 45 centimetres by 45 centimetres. According to the code of practice in Victoria, this cage should have no more than four birds in it, because the code requires 10 centimetres of front feeder space per bird. So with a 45-centimetre front you can only have four birds ... You can see that this cage has seven birds in it.³⁹

5.47 Mr Poole of NSW Department of Agriculture and Fisheries, in evidence to the Committee, also stated that there was some evidence that the stocking rate was exceeded in New South Wales. He mentioned the instance of one producer who exceeded the provisions of the Code because he used a particular type of cage system and a heavy strain of bird.⁴⁰

5.48 In contrast, NSW Department of Agriculture and Fisheries in its submission claimed that there was little evidence that the recommended stocking rates were exceeded in practice but conceded that no regular inspections were undertaken to ensure that this was so.⁴¹ Dr Murphy also indicated that, on the basis of her experience of the industry, there was little evidence of overstocking in Queensland.⁴²

5.49 The AVA pointed out to the Committee that while it is regrettable, overstocking can sometimes be economically advantageous. By increasing the number of birds housed in a facility, the capital, labour and other production costs per bird can be reduced, and these savings may offset lower flock performance and result in a greater capital return from the facility. This undesirable practice results, for example, in three layers being placed in a cage that was only designed to accomodate two.⁴³

5.50 The Committee believes that stocking densities should be strictly adhered to and enforced. The Committee therefore recommends that more regular inspections of commercial establishments be undertaken by the appropriate authorities to monitor husbandry practices generally and to ensure that stocking densities do not exceed those specified in the Code of Practice for the domestic fowl.

Cage Design

5.51 Many organisations and individuals, including Mr Macindoe, of NSW Department of Agriculture and Fisheries, and Dr Linda Murphy, a poultry researcher, who gave evidence to the Committee, commented on the need for improvements in cage design.⁴⁴

5.52 Cages designed, especially prior to the mid 1970s, often incorporated features that had undesirable welfare consequences. For instance, the design features often led to accidental trapping of hens involving the hens' comb, wing or toe. In addition, the cage design often reduced the space available for the hens, especially in the cage fronts at the feed trough.⁴⁵

5.53 A study by Professor Tauson of the Swedish University of Agricultural Sciences conducted over the period 1974-1984 found that the parts of the hens' body most frequently trapped were the head or neck (29 per cent), comb joint/jaw bones and the body/wings (28 per cent). Some 15 per cent of the trapped hens had their toes or claws trapped, 13 per cent their hocks and 16 per cent other parts of the body.⁴⁶ The study also found that 40 per cent of accidents in cages occurred between the manure deflector/egg guard and the cage floor/partition and 15 per cent occurred at the front of the cage. The rest occurred between the partition and the floor, in the wire mesh floor itself and in the feeder.

5.54 Tauson also found that in 1974, when his study first began, the mortality rate caused by accidental trapping due to poor cage design was more than 20 per cent of the total mortality rate. However in 1984, with improvements in cage design the frequency of accidental mortality did not exceed 0.1 - 0.2 per cent of hens housed, that is, about one per cent of total mortality.⁴⁷

5.55 Most cages in Australia are now imported from Europe and cost approximately \$8.00 per bird capacity to buy, assemble and instal, complete with automatic feeding, drinking and egg collection belts.⁴⁸ There is only one cage manufacturer in Australia at present.⁴⁹ The life of a cage system is of the order of 20 to 25 years.

5.56 In recent years the emphasis of research in Europe and the United Kingdom has been towards improving the design and welfare aspects of the cage system. Some significant improvements to cage design have resulted from this work. Recently cage manufacturers in Europe have become aware of the results of studies on behaviour patterns and biological performance of birds in a variety of modified and alternative cages. This information is increasingly influencing the design and layout of laying cages and equipment. Several manufacturers have taken the opportunity to redesign and improve their laying cages incorporating welfare benefits where possible. Such benefits include:

- the use of solid cage partitions to prevent excessive feather loss;
- horizontal bar gates which maintain better frontal feathering and provide easier access for several birds to the feeder at the same time;
- the installation of movable deflectors positioned at an increasing distance into the cage between the manure deflector short side and the side partition;
- improved methods of joining side and rear partitions with cage floors, so that gaps between them do not develop allowing birds' toes, legs, wattles, combs or heads to be trapped; trapping points causing injury or discomfort are now generally avoided in laying cages;

- some drinker lines have been repositioned and drinkers protected so as to give birds better access whilst limiting spillage and waste;
- cage floor slopes have been reduced by several manufacturers which aim to reduce shell damage in the collecting area;
- the use of smaller wire floor mesh sizes; and
- inspection techniques have been developed for birds in the upper tiers of multi-tiered cage blocks; such as steps on the lower tiers, moving gantries or mobile inspection steps or trolleys.⁵⁰

5.57 The Committee, during discussions with Professor Tauson questioned him regarding the possible benefits of these improved cage design features for bird welfare. He told the Committee that plumage condition was substantially improved in these new cages. He noted that feather loss was reduced by 15 per cent in cages using solid partitions as compared to wire partitions and feed consumption was also reduced for hens with good plumage.⁵¹

5.58 Tauson also commented on the improvement in foot condition where there was a smoother galvanising of the cage floor, a reduced floor slope and cages that used smaller wire mesh floor sizes.

5.59 The Committee, however, questioned Professor Tauson as to whether there was a welfare concern with cages that incorporated solid partitions, in that they may restrict the hens' visual contact with other birds. Professor Tauson argued that he did not believe this was a problem. He also pointed to the fact some cages now had semi-rear partitions - the birds were found to be calmer in these cages and also had better plumage condition.⁵² Tauson noted that there were two reasons for the

significant decrease in feather loss in cages with solid partitions. The first was that there was less feather pecking against the wings, head and tail and secondly, there was less abrasion.

5.60 Professor Tauson also told the Committee of several new cage design modifications that are taking place to enhance the birds' well-being.⁵³ These innovations have not been widely adopted in the design of cages at this stage. Following research by Professor Tauson perches and abrasive strips have been installed in conventional 4-bird cages on an experimental basis in an effort to improve foot and claw conditions.

5.61 Self-adhesive strips of abrasive tape have been placed onto the manure deflector\egg guard installed in cages to blunt the birds' claws. Excessively long claws may injure other birds and may get caught in various parts of the cage. Hens on cage floors are unable to successfully wear-down their claws as is done by birds kept on litter or on free-range.

5.62 Professor Tauson indicated that the installation of the abrasive strips had led to a marked reduction in the growth of the claws. The tape can be installed in existing cages and at relatively low cost. New cages sold in Sweden now have the abrasive tape attached, but they are not widely used elsewhere in Europe.

5.63 Another innovation has been the installation of perches in conventional cages housing up to five hens. Professor Tauson argued that they are used extensively and there is less arousal in the cage where they have been installed. They also have the effect of reducing feed consumption, due in part to the reduced heat loss as the hens tend to congregate together at night on the perch.

5.64 However, Professor Tauson indicated there were some problems with perches. One problem was an increased frequency of dirty eggs, as the manure is often not trampled through the floor under the perch. There was also a higher frequency of cracked eggs; although this was also dependent on the floor design of the cage.⁵⁴

5.65 Some research in Scotland involves the inclusion of nesting facilities, 'nest cups', as well as perches, in otherwise conventional cages. It is not clear at this stage, whether it will be feasible to include a nest box in small, for example, 4-5 bird, multi-bird cages.⁵⁵

5.66 The Committee questioned Professor Tauson concerning the attitude of cage manufacturers to his work.⁵⁶ He argued that initially most cage manufacturers adopted a negative attitude, especially because his work pointed out many of their cage design deficiencies. However, now the attitude of manufacturers is more positive and Tauson indicated that they consult with him on ways to improve their designs. The result is that now the innovations developed in Sweden have spread to most cage manufacturers in the rest of Europe.

5.67 The EEC Directive and European codes of practice have also had a major effect on the design of new laying cages in some European countries. Some producers have selected cage sizes that allow 480-500 cm² per bird for five birds, so that if a requirement of 600 cm² per bird is introduced during the life of their cages, it can be met by removing one bird.⁵⁷

5.68 Evidence to the Committee suggested that some of these design improvements have not yet being introduced in Australia. Dr Murphy told the Committee:

I think we should be trying to get the improvements in cage design which exist in Europe into Australia. For instance, I rang up a couple of our cage suppliers in Brisbane the other day and asked whether they had ever heard anything about cages with perches, which

I believe you can now buy in Europe, or cages with solid sides. ... I got a completely negative response. The people had never heard of such a thing as perches in the cages or cages with solid sides.⁵⁸

5.69 NSW Department of Agriculture and Fisheries suggested that some form of tax relief be made available to provide an incentive for egg producers to replace existing cages with newer cages incorporating improved design features.⁵⁹ This tax relief would provide an incentive for farmers to make that very substantial investment in upgrading their facilities, which would be beneficial from both a welfare and economic point of view. This proposal was supported by Dr Murphy although not by Dr Sheldon of AFWA.⁶⁰ He suggested that farmers replace cages for a variety of reasons, for example, to incorporate labour saving devices. He argued that a farmer would not replace his cages solely for welfare considerations especially given the life of a cage system.⁶¹

5.70 The Committee believes that any improved design features that advance welfare should be encouraged. The Committee, recognising the significant welfare benefits that may derive from the introduction of innovative cage design, recommends that the Commonwealth Government provide tax incentives to encourage farmers to invest in cages incorporating improved design features.

ENDNOTES

1. Evidence, Australian Council of Egg Producers, p. S8151, p. S8171.
2. Evidence, RSPCA Australia, p. S9062; ANZFAS, p. S8834.
3. Evidence, Australian Council of Egg Producers, pp. S8146-55; AFWA, pp. S8937-39; and NSW Department of Agriculture and Fisheries, pp. S8171-73.
4. Evidence, Australian Veterinary Association, p. 9350.
5. Evidence, Australian Council of Egg Producers, p. S8150.
6. Evidence, NSW Department of Agriculture and Fisheries, p. S8171.
7. Evidence, Mr Roth, NSW Department of Agriculture and Fisheries, p. 8780.
8. Evidence, Mr Holland, Australian Council of Egg Producers, p. 8732.
9. Evidence, Dr Kite, NSW Farmers Association, p. 8732.
10. Evidence, Australian Council of Egg Producers, p. S8151. Feather pecking refers to any pecking of the plumage, regardless of whether conducted by the bird itself or by another bird or birds.
11. *ibid.*, p. S8151.
12. Evidence, NSW Department of Agriculture and Fisheries, p. S8171.

13. Evidence, NSW Department of Agriculture and Fisheries, p. S8171.
14. Evidence, Dr Kite, NSW Farmers Association, p. 8702.
15. Evidence, Mr Miller, p. 9382.
16. Livestock and Grain Producers' Association of NSW, Animal Welfare in Agriculture, n.d., pp. 40-1.
17. Evidence, ANZFAS, p. S8840.
18. *ibid.*, p. S8841-8846.
19. Evidence, Dr H. Wirth, RSPCA Australia, p. 9601.
20. Evidence, Australian Veterinary Association, pp. 8769-8770.
21. Evidence, Dr L. Murphy, p. S8960.
22. Australian Bureau of Animal Health, Sub-Committee on Animal Welfare, Model Code of Practice for the Welfare of Animals: No. 2 - The Domestic Fowl, Canberra, 1983, Appendix 1.
23. NSW Department of Agriculture, 'Poultry Welfare - Recommended Stocking Rates', Agdex 450/20.
24. Evidence, Mr Holland, Australian Council of Egg Producers, p. 8716.
25. Evidence, Dr L. Murphy, p. 9553; and Dr Wirth, RSPCA Australia, p. 9601.
26. Evidence, ANZFAS, p. S8834.

27. B.O. Hughes, 'Space Requirements in Poultry', in S.H. Baxter et. al. (eds), Farm Animal Housing and Welfare, Martinus Nijhoff, Boston, 1983, p. 122.
28. *ibid.*, p. 121.
29. R. Zayan and J. Doyen, 'Spacing Patterns of Laying Hens Kept at Different Densities in Battery Cages', in R. Zayan (ed.), Social Space for Domestic Animals, Martinus Nijhoff, Dordrecht, 1985, pp. 57-64.
30. M.S. Dawkins and C. Nicol 'No Room for Manoeuvre', New Scientist, 16 September 1989, pp. 26-28.
31. M.S. Dawkins and S. Hardie, 'Space Needs of Laying Hens', British Poultry Science, 1989, 30:413-416.
32. H. Lagadic, 'Defining the Domestic Hen's Requirement for Space: Do Operant Conditioning Techniques and Physiological Measures of Stress Agree?', in J. Faure and A.D. Mills (eds.), The Proceedings of the Third European Symposium on Poultry Welfare, World Poultry Science Association, 1989, Tours, pp. 67-77.
33. See M.S. Dawkins, 'Welfare and the Structure of a Battery Cage: Size and Cage Floor Preferences in Domestic Hens', British Veterinary Journal 1978, 13:469-475; and M.S. Dawkins, 'Priorities in the Cage Size and Flooring Preferences of Domestic Hens', British Poultry Science, 1981, 22:255-263.
34. Hughes, *op. cit.*, p. 126.
35. EEC Directive (86/113/EEC).
36. H.A. Elson, 'A Welfare Update on Laying Cages', Poultry - Misset, April-May 1989, pp. 33-35.

37. Dawkins and Nicol, op. cit., p. 26.
38. Evidence, Australian Veterinary Association, p. S8770.
39. Evidence, Professor P. Singer, pp. 9454-9455.
40. Evidence, Mr Poole, NSW Department of Agriculture and Fisheries, pp. 8781-8782.
41. Evidence, NSW Department of Agriculture and Fisheries, p. S8172.
42. Evidence, Dr L. Murphy, p. 9546.
43. Evidence, Australian Veterinary Association, p. S8770.
44. Evidence, NSW Department of Agriculture and Fisheries, p. 8766; and Dr L. Murphy, p. 9547, p. 9555.
45. R. Tauson, 'Cages for Laying Hens: Yesterday and Today - Tomorrow?' in Faure and Mills, op. cit., p. 168.
46. R. Tauson, 'Effects on Welfare and Production of Redesign of Cages for Laying Hens', paper presented to the Cambridge Poultry Conference, 12 April 1988, p. 5.
47. R. Tauson, Technical Environment for Caged Laying Hens, Report No. 154, Swedish University of Agricultural Sciences, Uppsala, 1986, p. 16.
48. Evidence, NSW Department of Agriculture and Fisheries, p. S8171.
49. Evidence, Mr Poole, NSW Department of Agriculture and Fisheries, p. 8788.
50. Elson, op. cit., pp. 33-4.

51. Committee discussion with Professor Tauson, 14 May 1990.
52. *ibid.*
53. *ibid.*
54. *ibid.*
55. Elson, *op. cit.*, pp. 33-35, 86-88.
56. Committee discussion with Professor Tauson, 14 May 1990.
57. Elson, *op. cit.*, p. 33.
58. Evidence, Dr L. Murphy, p. 9555.
59. Evidence, NSW Department of Agriculture and Fisheries,
p. 8766, p. 8788, p. S8173.
60. Evidence, Dr L. Murphy, p. 9554.
61. Evidence, Dr Sheldon, p. 9524.