

# The European Union Ban on Conventional Cages for Laying Hens: History and Prospects

Michael C. Appleby

*The Humane Society of the United States  
Washington, D.C.*

Since the publication of *Animal Machines* (Harrison, 1964), there has been widespread public pressure in Europe—supported by European institutions—to “ban the battery cage.” The European Union (EU) and national governments (particularly in Northern Europe) funded research on noncage systems for egg production and enriched cages. In 1986, the EU passed a Directive specifying a minimum size for cages, but public opinion—again particularly in the North—continued to require more. A market sector emerged that would pay more for noncage eggs. Denmark, Sweden, and Switzerland passed more stringent legislation than the rest of Europe. A 1999 Directive with details based on advice from the EU’s Scientific Veterinary Committee will phase out conventional laying cages but allow enriched cages. Implementation depends on various factors, including negotiations in the World Trade Organization. In the next 10 years, however, major changes to the housing of most laying hens in Europe almost certainly will occur. Similar changes in other countries will follow. As in Europe, change probably will be piecemeal, affected both by public pressure and by all sectors of society: producers, retailers, consumers, legislators, and the media.

On June 15, 1999, the new European Union (EU) Directive on welfare of laying hens was passed, which requires conventional laying cages to be phased out by 2012. Enriched laying cages will still be allowed. In this article, I outline how this came about and the scientific, social, economic, and political issues involved. I consider prospects for the future, both within and outside the EU, and implications for animal welfare in other countries.

Activity by the EU in this area was preceded by involvement of the Council of Europe. This represents most of the countries of Europe: The number of countries rose to 44 in 2002. In 1976, the Council of Europe produced the Convention on the Protection of Animals Kept for Farming Purposes, which is considered in context below.

The EU (Table 1) is the successor of the European Community, which started as a subset of the Council of Europe. It has three key bodies. The European Parliament consists of members directly elected by constituents in each country and shares with the Council of Ministers the power to legislate. The Council of Ministers is the main decision-making body and consists of one representative from each country; for agricultural matters, it consists of the 15 countries' Ministers of Agriculture. Presidency of the Council is held for 6 months by each country in turn. The European Commission is appointed by member countries to manage the Union, including by drafting legislation.

The EU can enact Regulations or Directives, among other legislation. Regulations are binding throughout the EU and overrule any contradictory national legislation. Directives are not themselves operative in the member countries but direct each country to pass national legislation to put them into effect. For either, the mechanism is as follows. The Commission drafts legislation, either on its own ini-

TABLE 1  
Countries of the European Union and the System of Qualified Majority  
Voting Used by the Council of Ministers

<i>Country</i>	<i>Votes</i>
Austria	4
Belgium	5
Denmark	3
Finland	3
France	10
Germany	10
Greece	5
Ireland	3
Italy	10
Luxembourg	2
Netherlands	5
Portugal	5
Spain	8
Sweden	4
United Kingdom	10
Total	87
Required for directive to be adopted	62
Blocking minority	26

*Note.* Number of votes is determined primarily by population.

tiative or when requested to do so by the Council. The Parliament may amend the draft. The Council amends it further and passes or rejects the final version with joint authority from the Parliament. On matters such as those with which I am concerned, this decision is made by Qualified Majority (Table 1).

The emergence of these complex structures is in large part accounted for by the historical and political diversity of the countries of Europe. That diversity is further reflected in attitudes toward animals.

## ATTITUDES TOWARD ANIMAL WELFARE

Concern for farm animal welfare varies across Europe, being generally stronger in the North—particularly in the United Kingdom, The Netherlands, Germany, and Scandinavia—and weaker in the South. Reasons are complex, but one possible explanation is that concern has largely developed among people not involved in farming. Support for this explanation was provided in 1981 by a review of which countries had then ratified the Council of Europe's 1976 Convention on farm animals (see Table 2). Of the 21 countries then members, the 11 that ratified first were mostly from the North and had an average of only 6% of the population involved in agriculture. Countries that ratified later were mostly southern and had an average of 21%. As well as differences in attitudes, this pattern may have reflected that in areas where many people are engaged in agriculture, their governments are unwilling to impose restrictions affecting their livelihood. The agricultural industry is also effective at lobbying for its interests.

In recent years, concern for animal welfare has also grown in southern Europe, as indicated by public opinion polls. However, southern governments continue to be less positive toward welfare than are northern governments (Sansolini, 1999a).

Other priorities that vary between countries may also affect animal welfare. Norway has legislation to limit farm size because it regards rural employment as important, and this limitation probably has some benefits for animal welfare. France puts emphasis on food quality, which also has some positive effects: Some noncage eggs are probably bought in France because people believe they taste better.

In 1964, publication in the United Kingdom of Harrison's (1964) book had a large, international impact. It increased awareness of intensive farming methods, including cages for laying hens, and concern for farm animal welfare. The United Kingdom Government immediately set up a committee to inquire into the welfare of animals kept under intensive husbandry, which confirmed that there was cause for concern (Brambell, 1965). A new law was passed in 1968 that increased protection of farm animals and also led to establishment of the independent Farm Animal Welfare Council (FAWC). The Brambell report and FAWC both have had an international influence too, including through their development of the concept of five freedoms.

TABLE 2  
 Ratification of the Council of Europe's 1976 Convention on the Protection of Animals Kept for Farming Purposes by 1981, and the Proportion of Each Country's Population Involved in Agriculture (Ludvigsen et al., 1982)

<i>Ratified</i>	<i>Agricultural Labor (%)</i>	<i>Not Yet Ratified</i>	<i>Agricultural Labor (%)</i>
Belgium/Luxembourg	4	Austria	9
Cyprus	—	Greece	30
Denmark	8	Iceland	9
France	9	Ireland	23
Netherlands	5	Italy	12
Norway	8	Liechtenstein	—
Sweden	5	Malta	5
Switzerland	5	Portugal	26
UK	2	Spain	17
West Germany	4	Turkey	54
Average	6		21

*Note.* Reprinted from *Livestock Production Science*, 9, J. B. Ludvigsen, J. Empel, F. Kovacs, M. Manfredini, J. Unshelm, & M. Viso, "Animal Health and Welfare," pp. 65–87, 1982, with permission from Elsevier BV.

## HOUSING SYSTEMS FOR LAYING HENS

By 1970, most hens kept for egg production in the developed world were housed in conventional laying cages, often called *battery cages*. It is widely acknowledged that conventional cages cause many welfare problems. They compromise most or all of FAWC's (1997) five freedoms (freedom from hunger and thirst; from discomfort; from pain, injury, and disease; to express normal behavior; and from fear and distress). They even contravene the very limited freedoms recommended in Brambell (1965), which stated that farm animals should have freedom to stand up, lie down, turn around, groom themselves, and stretch their limbs. Work on alternative housing systems, primarily aimed at reducing welfare problems, was active from the 1970s to the 1990s.

National governments in northern Europe, with some contribution from welfare organizations, funded most of this work on alternatives. The main emphasis was on noncage systems such as deep litter, straw yards, and free range in the United Kingdom (Appleby, Hogarth, Anderson, Hughes, & Whittemore, 1988; Gibson, Dun, & Hughes, 1988; Keeling, Hughes, & Dun, 1988), slatted floors in Denmark (Nørgaard-Nielsen, 1986), and tiered wire floors in The Netherlands (Blokhuis & Metz, 1992). There was also work in the United Kingdom and Germany on a modified get-away cage (Elson, 1981; Wegner, 1990). However, there is one major welfare problem that is generally worse in all these systems than in battery cages. If birds are not beak trimmed, cannibalism is likely, often affecting a high proportion of birds. Beak trimming is practiced as a preventative measure, but

this mutilation has become increasingly controversial. It removes the touch-sensitive beak tip, an important sense organ (arguably second most important after the eyes). Furthermore, the operation is painful in the short term and, if done in adults, in the long term (Gentle, 1986, 1997).

The prospect that it may be possible to avoid cannibalism without beak trimming was raised by developments in Switzerland, which from 1992 banned both laying cages and beak trimming. Various systems based on the Dutch tiered-wire floor designs are used (Matter & Oester, 1989). It seems that performance of these, and welfare of the birds, was relatively poor at first but there was then improvement, including declining incidence of cannibalism (Fröhlich & Oester, 2001). This improvement presumably was the result of experience in both management decisions—providing relatively small groups of birds with varied environments—and husbandry—supervision of flocks by farmers appears more meticulous than in other countries (personal observation). Farm size and number of birds per worker are small compared to other countries though, and Swiss success has yet to be replicated elsewhere. Cannibalism is rare in battery cages, even among birds with untrimmed beaks, but it must be noted that beak trimming of pullets who will be housed in cages when mature is nevertheless usual, partly to reduce feather pecking.

A possible causal factor for cannibalism in noncage systems is their larger group size, although this is not proven (Hughes & Duncan, 1972). Work therefore began in the mid-1980s, in several countries, on modifying cages for small groups. What the EU 1999 Directive refers to as enriched cages provide increased area and height compared to conventional cages and also a perch, a nest box, and a litter area (Appleby et al., 2002; Sherwin, 1994). These provisions address the main welfare problems in battery cages. For example, Baxter (1994) commented that

Concern over the welfare of caged hens arises in two general areas: first, that the barren environment within a cage prevents the performance of hens' natural behaviour patterns and, secondly, that the small amount of space in a cage imposes severe restrictions on hens' general freedom of movement. (p. 614)

Baxter then outlined the most important behavior patterns, prevented in battery cages, as perching and roosting, nesting, and use of litter.

Other important work on improving cages included that by Tauson in Sweden. Surveys of the incidence of trapping and injury of caged hens (Tauson, 1985) led to improvement in design and reduction in incidence (Tauson, 1988). Tauson (1986) also developed an abrasive strip, which attached to the egg guard behind the food trough, prevents overgrowth of claws.

The EU financed background scientific work on poultry welfare in a farm animal welfare coordination program from 1979 (Tarrant, 1983). Another important backup is the series of European Symposia on Poultry Welfare held by the World Poultry Science Association every 4 years from 1981 (following a predecessor in Denmark in 1977). The sixth was in Switzerland in September 2001.

Egg production costs more in all alternatives than in battery cages (Table 3). However, over the same period a market was developing for noncage eggs. Some people, again particularly in the north, will pay more for such eggs either because they are concerned about the welfare of hens or because they perceive the eggs to be more nutritious, tastier, or healthier. So a proportion of producers continued to keep hens in noncage systems, covering the higher cost by obtaining a higher selling price for the eggs. Lack of specifications soon became a problem: In particular, eggs sold as free range might come from hens allowed to range only inside a house or only if they could find one small exit from a large building. The EU acted in 1985 by imposing a regulation (later amended; CEC, 1991) defining four labels that can be put on eggs and the corresponding conditions in which hens must be kept (Table 4). In the absence of one of those labels, eggs are presumed to come from cages. This regulation has a big impact on how noncage hens are kept. There are no laws, in any country, on maximum floor stocking rates. To get a premium for deep litter eggs, however, producers must not exceed seven hens per square meter; otherwise, they would have to sell the eggs unlabeled at a loss.

No full economic analysis of enriched cages has been published, but egg production is likely to cost approximately 10% more from these than from battery cages (Appleby, 1998). However, as eggs from enriched cages cannot be given any of the labels in Table 4, shoppers cannot distinguish them from battery eggs. Therefore, farmers will not use enriched cages in the EU unless required to do so by law or their buyers.

TABLE 3  
Cost of Egg Production in Different Systems Relative to Laying Cages With 450 cm<sup>2</sup>/Bird

<i>System</i>	<i>Space<sup>a</sup></i>	<i>Relative Cost (%)</i>
Laying cage	450 cm <sup>2</sup> /bird	100
Laying cage	560 cm <sup>2</sup> /bird	105
Laying cage	750 cm <sup>2</sup> /bird	115
Laying cage	450 cm <sup>2</sup> /bird + nest	102
Shallow laying cage	450 cm <sup>2</sup> /bird	102
Get-away cage	10 to 12 birds/m <sup>2</sup>	115
Two-tier aviary	10 to 12 birds/m <sup>2</sup>	115
Multitier housing	20 birds/m <sup>2</sup>	105 to 108
Deep litter	7 to 10 birds/m <sup>2</sup>	118
Straw yard	3 birds/m <sup>2</sup>	130
Semi-intensive	1000 birds/hectare	135 (140 including land rental)
Free range	400 birds/hectare	150 (170 including land rental)

*Note.* From Elson (1985) reprinted with permission from author.

<sup>a</sup>Space refers in cages to cage floor area, in houses to house floor area, and in extensive systems to land area.

TABLE 4  
Criteria Defined by the European Union for Labeling of Eggs

<i>Label</i>	<i>Criteria</i>
Free range	Continuous daytime access to ground mainly covered with vegetation; maximum stocking density 1,000 hens/hectare
Semi-intensive	Continuous daytime access to ground mainly covered with vegetation; maximum stocking density 4,000 hens/hectare
Deep litter	Maximum stocking density 7 hens/m <sup>2</sup> ; a third of floor covered with litter; part floor for droppings collection
Perchery or barn	Maximum stocking density 25 hens/m <sup>2</sup> ; perches, 15 cm for each hen

*Note.* From CEC (1991).

Approximately 20% of eggs sold in the United Kingdom come from noncage systems, either free range or barn. In The Netherlands, Germany, and Denmark, deep litter eggs are more popular. In recent years, some supermarkets in northern Europe have responded to customer concerns and started to label “Eggs from caged hens,” and the EU is moving toward making this mandatory.

## DEVELOPMENTS IN INDIVIDUAL EUROPEAN COUNTRIES

Animal welfare legislation in the individual countries of Europe also shows a dichotomy that reflects attitudes. Northern countries have detailed laws with codified lists of actions that are prohibited. Southern countries tend simply to state that animals must not be ill-treated. Legislation is also enforced more strictly in some countries than in others.

Several of the northern countries have passed legislation or made other changes over the last half century that have affected the welfare of caged hens both within and outside their borders. Denmark’s 1950 Protection of Animals Act was interpreted as prohibiting battery cages, but this proved difficult. In 1979, a new Act allowed cages, but with a minimum area of 600 cm<sup>2</sup> per bird. In the United Kingdom, the Agriculture (Miscellaneous Provisions) Act of 1968 led to Codes of Recommendation for the Welfare of Livestock (MAFF, 1969, 1987) and to the establishment of the Farm Animal Welfare Council (FAWC, 1986, 1991, 1997). Sweden passed an Animal Welfare Act in 1988 that took particular account of Tauson’s (1985, 1986, 1988) work in that country, mandating that by 1994 all cages should be fitted with a claw shortening system and a perch. The Act also said that from 1999 hens should not be kept in cages but imposed conditions on this ban, including that beak trimming would not be allowed. In 1997, it was decided that the conditions could not be met and the ban was deferred. Enriched cages were introduced commercially in Sweden

from 1998 with, despite the lack of beak trimming, no reported problems of cannibalism (Tauson, 2000; Tauson & Holm, 2001).

Denmark, the United Kingdom, and Sweden are members of the EU. Switzerland, which is not, is the only country in the world to have banned laying cages, from 1992. This was the result of a 1978 referendum in which people were informed of the economic consequences of the decision (Appleby, Hughes, & Elson, 1992). Systems used in Switzerland were discussed previously.

## THE 1976 CONVENTION AND THE 1986 DIRECTIVE

From the late 1970s on, an underlying influence was the Council of Europe's 1976 Convention on the Protection of Animals Kept for Farming Purposes. When members had ratified it, they were obliged to take it into account, and that included all the countries in Table 2—except Turkey, which still has not ratified—and others as they joined subsequently. Articles 3 and 4 (Council of Europe, 1976) stated as follows:

Animals shall be housed and provided with food, water and care which—having regard for their species and to their degree of development, adaptation and domestication—is appropriate to their physiological and ethological needs, in accordance with established experience and scientific knowledge.

The freedom of movement appropriate to an animal, having regard to its species and in accordance with established experience and scientific knowledge, shall not be restricted in such a manner as to cause it unnecessary suffering or injury. Where an animal is continuously tethered or confined it shall be given the space appropriate to its physiological and ethological needs. (p. 2)

Because the Convention itself is broad, there is a standing committee with responsibility for elaborating more specific requirements, and poultry welfare was one of the first areas in which it became active.

In addition to individual countries, the EU became a party to the Convention in 1978 and decided that it should act on the welfare of laying hens. A Directive was adopted in 1986 laying down minimum standards for the protection of hens in battery cages (CEC, 1986). By January 1988, all newly built cages had to provide 450 cm<sup>2</sup> per hen and other requirements, and these standards were to apply to all cages by January 1995. This was one of the first Europe-wide statutes that actually specified how animals were to be kept. Prior to this, approximately half the hens in Europe were given less than 450 cm<sup>2</sup> each. Probably few cages in Europe met all the criteria in the Directive—for area, feeding space, height, and floor slope. All members of the EU had to translate the Directive into national legislation. In the United

Kingdom, for example, this was done in 1987. The United Kingdom also amended its Welfare Code; this previously recommended more than 450 cm<sup>2</sup> (MAFF, 1969) but was changed to meet only that legal minimum (MAFF, 1987). Denmark and Sweden, by contrast, continue to provide more than this.

## DEVELOPMENTS LEADING TO THE 1999 DIRECTIVE

Meanwhile, much relevant research continued. In 1989, Dawkins and Hardie reported that brown hens, just standing still, took up 475 cm<sup>2</sup>, and by simply turning round, 1,272 cm<sup>2</sup>. By 1992, although the 1986 Directive still was not fully in force, there was pressure for further change, and the European Commission put out a Draft for a new Directive (CEC, 1992). This recommended that cages should provide 800 cm<sup>2</sup> per hen. There was no immediate action on this, however, perhaps because of negative reaction from the industry. So, in 1995 the Commission asked its Scientific Veterinary Committee (Animal Welfare Section) to update an earlier report on welfare in different housing systems. It did so in 1996. It noted that all systems have welfare benefits and deficiencies:

[In c]urrent battery cage systems ... the risk of cannibalism is low and there is no necessity for beak trimming. ... [However,] because of its small size and its barrenness, the battery cage as used at present has inherent severe disadvantages for the welfare of hens.

To retain the advantages of cages and overcome most of the behavioural deficiencies, modified enriched cages are showing good potential in relation to both welfare and production.

Housing systems such as aviaries, percheries, deep litter or free range provide ... improved possibility for the birds to express a wider range of behaviour patterns. ... [However,] mainly because of the risk of feather pecking and cannibalism, these systems have severe disadvantages for the welfare of laying hens. (Scientific Veterinary Committee, 1996, p. 109)

On space allowances, the Committee commented

It is difficult to draw firm conclusions on space requirements because they vary according to the resources included in the space and to the group size. Individual birds need more area for certain activities than the 450 cm<sup>2</sup>/bird currently required in battery cages. (Scientific Veterinary Committee, 1996, p. 110)

In March 1998, the Commission brought out another proposal for a new Directive (CEC, 1998). It was oddly framed in that it would require hens to be provided with nests and litter but that

Member states may authorise derogation from [those requirements] in order to permit the use of battery cages if the following conditions are met:

- a) At least 800 cm<sup>2</sup> of cage area ... shall be provided for each hen;
- b) Cages shall be at least 50 cm high at any point. (CEC, 1998, p. 5)

Enriched cages, “equipped with litter, perches and a nestbox” (CEC, 1998, p. 3), were mentioned as a possible housing system and required to be 50 cm high, but not discussed further.

This was the time at which Sweden started introducing enriched cages on a commercial basis. So in late 1998, a number of representatives of the Council of Ministers and the Commission’s Directorate-General for Agriculture visited Sweden to see the advantages and disadvantages of enriched cages. Germany had the presidency of the Council in the first half of 1999 and indicated that it wanted to ensure adoption of the Directive in that period. The German presidency (i.e., the German Ministry of Agriculture with support from the rest of the German government) recognized that the proposed Directive did not give enough details of enriched cages for these to be properly regulated. So they put forward an amended version in early January (CEC, 1999b). This avoided the words “battery” and “enriched” altogether, and said that

All cage systems [must] comply at least with the following requirements:

- a) Where the cage contains 8 hens or more, at least 550 cm<sup>2</sup> of cage area ... must be provided for each hen;
- b) Where the cage contains fewer than 8 hens, at least 800 cm<sup>2</sup> of cage area must be provided for each hen ...
- f) Cages must also provide: a nest and an area with or without litter enabling hens to peck and scratch. (CEC, 1999b, p. 7)

In other words they proposed to ban battery cages but not enriched cages.

The European Parliament debated the proposed Directive in late January 1999 and also amended the first version of the Directive, voting heavily to replace the derogation for battery cages with the following provision: “The use of battery cages shall be prohibited” (LyMBERY, 1999). The Parliament did not, however, delete the mention of enriched cages as a permissible system. They too voted to ban battery cages but not enriched cages.

The final decision would be taken by the Council of Ministers. Strictly speaking, it might not be completely final. If the Council did not act as the Parliament wanted, the Parliament could then require it to think again—as it has done recently when the Parliament voted to ban sales of cosmetics tested on animals and the Council demurred. However, the Parliament might not have persisted, and therefore, the Council decision would be important.

## THE 1999 DIRECTIVE

Governments then put the proposals out for consultation. Meanwhile lobbying intensified because the Council would be using Qualified Majority Voting (Table 1), and if several countries voted against the Directive it would fall. Indeed, unanimity is desired, so if several countries were known to be planning to vote against, the vote would have been deferred. Groups such as Eurogroup for Animal Welfare and Compassion in World Farming (CIWF), which supported a ban on battery cages, were particularly active in lobbying countries thought likely to oppose it such as Portugal—which stated publicly that it planned to do so (Aguirre y Mendes, 1999). Another possible opponent was Italy, but Italy announced on May 20 that it would support the ban (Sansolini, 1999b). On June 15, 1999, 13 of the 15 countries voted for the Directive. Only Austria voted against, and it did so because it did not consider it went far enough. Spain abstained (CIWF, 1999).

The key provisions of the Directive are shown in Table 5. It will phase out barren battery cages by 2012, with an interim measure requiring 550 cm<sup>2</sup> per hen by 2003. All new cages from 2003 and all cages from 2012 must provide 750 cm<sup>2</sup> per hen, nest box, perch, and a litter area for scratching and pecking. Requirements for noncage alternatives also change; litter currently is not required in percherries (Table 4), but from 2007 it will be needed in all houses. The situation will be reviewed before the end of 2004.

There was confusion for some time about exactly what had been decided, with headlines along the lines of “Battery Cages Banned.” Many believed that cages had been prohibited altogether. The situation was to some extent clarified by articles such as Elson’s (1999), but it still is not clear what actually will happen on most commercial farms, as is seen following.

## COMMENTARY

Welfare groups welcomed the Directive (CIWF, 1999). The Royal Society for Prevention of Cruelty to Animals (n.d.) stated that “As more producers become familiar with the design and management of alternative systems, enriched cages offer few benefits” (p. 9), and their Freedom Foods standards do not allow cages. They do not, however, mention the problems of beak trimming or cannibalism in alternative systems.

It is questionable whether a complete ban on cages would have been possible in the EU in 1999 or the foreseeable future. Such a ban would have faced the arguments that caused Sweden to defer its own ban in 1997—that there would be prob-

TABLE 5  
Key Points of the European Union 1999 Directive Laying Down Minimum Standards  
for the Protection of Laying Hens

---

Unenriched (conventional) cages

From January 1, 2003, no new conventional cages may be brought into service and existing cages will have to provide 550 cm<sup>2</sup> per bird and a claw shortener

From January 1, 2012, conventional cages are prohibited

Enriched cages

From January 1, 2002, enriched cages must provide 750 cm<sup>2</sup> per bird, of which at least 600 cm<sup>2</sup> is at least 45 cm high  
A minimum total cage area of 2,000 cm<sup>2</sup>

A nest

Litter such that pecking and scratching are possible

15 cm perch per hen

12 cm of food trough per hen

A claw shortener

Alternative systems

From January 1, 2002, new noncage systems must have

A maximum of 9 hens per m<sup>2</sup> of usable area

Litter occupying at least one third of the floor

15 cm perch per hen

From January 1, 2007, all noncage systems must comply with these conditions

Review

By January 1, 2005

the Commission shall submit to the Council a report, drawn up on the basis of an opinion from the Scientific Veterinary Committee, on the various systems of rearing laying hens, and in particular on those covered by this Directive, taking account both of pathological, zootechnical, physiological, and ethological aspects of the various systems and of their health and environmental impact.

That report shall also be drawn up on the basis of a study of the socio-economic implications of the various systems and their effects on the Community's economic partners.

In addition, it shall be accompanied by appropriate proposals taking into account the conclusions of the report and the outcome of the World Trade Organisation negotiations. (CEC, 1999a, p. 56)

---

*Note.* From CEC (1999a).

lems in both practical and welfare terms. A complete cage ban also might have had more economic impact and made it more difficult for the EU to protect its egg industry against competition from the rest of the world. There is, therefore, a case that the availability of enriched cages enabled the ban on battery cages. Some commentators have suggested that enriched cages will never be common commercially outside Sweden (CIWF, 1999). Even if that is true, however, they have advanced the issue. Germany decided in 2001 that, in the context of a Europe-wide phasing out of battery cages, it also will disallow enriched cages within its own borders, producing a situation similar to that in Switzerland.

The egg industry responded negatively. A September 1999 meeting of the International Egg Commission, representing 33 countries, resolved to seek funding of \$1 million for action to overturn the ban on battery cages. One reason must have

been solidarity in face of what was perceived as an attack on its European members. In addition “a domino effect is feared by the U[nited] S[tates], Canada, and Australia” (Farrant, 1999, p. 1).

The Directive took due notice of scientific information, especially the advice of the Scientific Veterinary Committee (1996). In allowing the continued use of cages, albeit enriched, it acknowledged that there are advantages and disadvantages to both cages and noncage systems. In requiring provision of nests, litter, and perches in all systems, it recognized the strong evidence of hens’ motivation for these facilities (Baxter, 1994). Decisions on space allowances were problematic, as admitted by the Committee, given that hens’ response to space is curvilinear (Appleby, 1997). An allowance of 600 cm<sup>2</sup> per hen in the main part of the cage inevitably is somewhat arbitrary but does allow an important increase in local freedom of movement over 450 cm<sup>2</sup>, which is approximately equal to a hen’s body area (Dawkins & Hardie, 1989). The total of 750 cm<sup>2</sup> per hen means that almost all cages will give only 150 cm<sup>2</sup> per hen nesting space; this is too restricted (Appleby, 1998). Although the total figure of 750 cm<sup>2</sup> is not as important as its constituent parts (cage, nest box), it may have been a political decision, backtracking a little from the 800 cm<sup>2</sup> in the drafts. The allowance of 15 cm perch per hen appears to reflect established expectations such as the requirement in a perchery (Table 4). The allowance of 12 cm of food trough per hen is reasonable for white birds, as they can perch in this width (Tauson, 1984); it is inadequate for brown birds when they feed simultaneously, as they do several times each day when the automatic system brings fresh food to each cage.

Comment also is needed on Germany’s action to ban cages altogether. A similar response is being considered by The Netherlands and the United Kingdom. This must depend partly on their weighting of the advantages of noncage systems—primarily freedom of movement and increased variety of behavior—against the disadvantages: primarily the need for beak trimming to prevent cannibalism. Thus, the decision includes some elements both of science and of general attitudes to welfare. It is recognized that people vary in their attitude toward welfare, emphasizing either animal feelings, functioning, or naturalness (Fraser, Weary, Pajor, & Milligan, 1997). This decision may reflect an increased emphasis on naturalness in Germany, sometimes expressed in the criticism that an enriched cage is still a cage.

If full implementation of the Directive is achieved by 2012, as planned, it then will be 48 years after Harrison (1964) increased the profile of this issue. Taking a half century to achieve just one of Harrison’s called-for changes, and arguably only partially at that, cannot be described as precipitate action.

Implementation of the Directive will be affected by the timing and content of the review by the EU Scientific Veterinary Committee (now the Scientific Committee on Animal Health and Animal Welfare) and the subsequent Commission report (Table 5). The review will consider “socio-economic implications,” together

with “the outcome of the World Trade Organisation [WTO] negotiations” (Table 5). Therefore, we must consider the implications of international trade.

## INTERNATIONAL TRADE

Negotiations are under way to extend the rules for free trade established by the WTO to agricultural products. The EU proposed that animal welfare should be taken into account in trade by allowing either agreements between trading partners that safeguard welfare, or labeling, or payment of subsidies to producers who maintain high welfare (European Communities, 2000). Still, the likelihood of this is uncertain.

“High standards of laying hen welfare can be implemented and sustained only if the EU market is protected against imports of eggs from third countries with lower standards” (Scientific Veterinary Committee, 1996, p. 111). That view is supported by a suggestion that in its current form, the Directive will weaken EU competitiveness to such a degree that 65% of domestic consumption could be substituted by imported eggs (Wolfram, Simons, Giebel, & Bongaerts, 2002). However, it can be argued that this is a considerable overstatement. Denmark for years has had more stringent legislation on cages than the rest of Europe. Its egg industry survives, albeit it is perhaps smaller than it might otherwise have been. If this applies within Europe, it applies even more to the threat of longer distance imports to European countries from outside Europe, at least with regard to whole eggs. There is a danger, however, that imports of processed eggs, which make up 25% of European egg production, would rise in the absence of protection: With the shells removed, eggs can be pasteurized or dried, kept for long periods, and easily transported.

## FUTURE DEVELOPMENTS

Installation of noncage systems probably will increase slowly in the short term. At least for the next few years, producers operating such systems will still get premiums for their egg sales.

Various manufacturers are offering models of enriched cages, and research on details of design is in progress. Before the Commission report is released, however, few enriched cages will be installed outside Sweden.

Some producers doubtless continued to install conventional cages right up to December 2002. Some used models that are convertible to enriched cages; for example, a model of this kind is sold by Big Dutchman, the largest European cage manufacturer. Others used standard models, taking the risk that they will be usable only until 2011 (J. Campbell, personal communication, March 15, 2001)—or perhaps a while longer if the Directive’s deadline is not strictly enforced.

Longer term prospects depend on many factors, including the WTO negotiations, but one point needs to be made. It has been emphasized that noncage systems have two major alternative welfare problems: (a) cannibalism or (b) beak trimming to prevent it. If strains of birds can be developed that reliably do not show cannibalism, then probably cages eventually will be phased out altogether. There is evidence that such genetic selection is possible (Muir, 1996). For three reasons, however, it is not in the economic interests of the major poultry companies. Adding any such criterion could reduce their ability to breed for other more profitable characteristics. Discontinuing beak trimming would decrease feed efficiency, as untrimmed birds peck more (Duncan, Slee, Seawright, & Breward, 1989). Success would favor the move from cages to other systems, which the industry sees as unfavorable for many reasons including ease of management, labor efficiency, and disease control (Appleby et al., 1992). Thus, mechanisms that enforce such selection against cannibalism are one of the most important requirements for long-term improvement of laying hen welfare. If that happens, enriched cages perhaps will have been only a medium-term development.

## IMPLICATIONS FOR OTHER COUNTRIES

There are lessons for other countries, even from such a complex history with so many aspects specific to Europe. The United States is taken as a particular example.

Rapid progress cannot be expected. The European Symposia on Poultry Welfare effectively started in 1977. The First (and so far only) North American Symposium on Poultry Welfare was held in 1995 in Edmonton, Alberta, Canada, and related changes of attitude have still not gathered pace.

However, progress is possible. One of the most important agents for change is public opinion. Politicians in every European country and institution comment that they receive more letters on animal welfare than on any other subject and that this puts pressure on them and strengthens them in countering industrial influence. American politicians have made similar comments. Furthermore, it seems that expectations of American citizens are being affected by developments in Europe. It is likely, however, that differences of the American political system from that in Europe mean that even more pressure from the public will be needed to effect similar change.

The United States is a single country; but as a union of semiautonomous states, it has much in common with the EU. Individual European countries were successful acting alone, and these actions finally led to communal action. Similarly, single American states could take initiatives on hen housing as they have done in some instances on pig farming.

In fact almost all of the previously mentioned history shows that piecemeal change is both worthwhile in itself and finally accumulates into wholesale change.

This applies, for example, to labeling. Much of the discussion about labeling refers to giving consumers a choice. With regard to welfare, choice is not the important issue: It is desirable to improve the welfare of all hens, not just a small, labeled proportion. Yet that some people buy free range eggs and Freedom Foods demonstrates that a significant proportion will “put their money where their mouth is” and has led the way for more widespread change. Labeling schemes in the United States—such as the Certified Humane label of the Humane Farm Animal Care—could usefully receive more emphasis.

Similarly, the initiative by McDonald’s® in 2000 to require its egg suppliers to increase their cage size (Stevenson, 2000) parallels the actions by some European supermarkets and has influenced other commercial companies to make similar moves, with cooperation from the majority of producers associated as United Egg Producers. It is possible that nongovernmental action to influence market structure is a more promising route than regulation in the United States.

The EU ban on battery cages is the cumulative result (and even now only a partial result) of activity on many different fronts. Some of these have not been mentioned in this account so far, such as the pressure on the EU to agree—which it finally did (CEC, 1997)—that animals are sentient beings, not just products. Any campaign in other countries such as the United States must be similarly multifaceted, bringing pressure to bear on all relevant groups—including producers, retailers, consumers, legislators, and the media.

## ACKNOWLEDGMENT

A longer version of this article will appear as Appleby (in press).

## REFERENCES

- Aguirre y Mendes, A. (1999). Portugal—Press campaign and political lobbying. *Agscene*, 135, 9.
- Appleby, M. C. (1997). Life in a variable world: Behaviour, welfare and environmental design. *Applied Animal Behaviour Science*, 54, 1–19.
- Appleby, M. C. (1998). The Edinburgh modified cage: Effects of group size and space allowance on brown laying hens. *Journal of Applied Poultry Research*, 7, 152–161.
- Appleby, M. C. (in press). The EU ban on battery cages: History and prospects. In D. J. Salem & A. N. Rowan (Eds.), *The state of the animals 2003*. Washington, DC: Humane Society Press.
- Appleby, M. C., Hogarth, G. S., Anderson, J. A., Hughes, B. O., & Whittemore, C. T. (1988). Performance of a deep litter system for egg production. *British Poultry Science*, 29, 735–751.
- Appleby, M. C., Hughes, B. O., & Elson, H. A. (1992). *Poultry production systems: Behaviour, management and welfare*. Wallingford, England: CABI.
- Appleby, M. C., Walker, A. W., Nicol, C. J., Lindberg, A. C., Freire, R., Hughes, B. O., et al. (2002). Development of furnished cages for laying hens. *British Poultry Science*, 43, 489–500.

- Baxter, M. R. (1994). The welfare problems of laying hens in battery cages. *Veterinary Record*, 134, 614–619.
- Blokhuis, H. J., & Metz, J. H. M. (1992). Integration of animal welfare into housing systems for laying hens. *Netherlands Journal of Agricultural Science*, 40, 327–337.
- Brambell, F. W. R. (1965). *Command paper 2836*. London: Her Majesty's Stationery Office.
- CEC (Commission of the European Communities). (1986). Council directive 86/113/EEC: Welfare of battery hens. *Official Journal of the European Communities*, L 95, 45–49.
- CEC (Commission of the European Communities). (1991). Commission Regulation (EEC) No. 1274/91 of 15 May 1991 introducing detailed rules for implementing Regulation (EEC) No. 1907/90 on certain marketing standards for eggs. *Official Journal of the European Communities*, L 121, 11–24.
- CEC (Commission of the European Communities). (1992). *European Communities Draft Recommendations No. VI/2327/92*. Brussels, Belgium: Author.
- CEC (Commission of the European Communities). (1997). *Protocol on the welfare and protection of animals*. Brussels, Belgium: Commission of the European Communities.
- CEC (Commission of the European Communities). (1998). *Proposal for a council directive laying down minimum standards for the protection of laying hens kept in various systems of rearing*. Brussels, Belgium: Commission of the European Communities.
- CEC (Commission of the European Communities). (1999a). Council Directive 1999/74/EC laying down minimum standards for the protection of laying hens. *Official Journal of the European Communities*, L 203, 53–57.
- CEC (Commission of the European Communities). (1999b). *Proposal for a Council Directive laying down minimum standards for the protection of laying hens* [Amendment from the German Presidency]. Brussels, Belgium: Commission of the European Communities.
- CIWF (Compassion in World Farming). (1999). Europe agrees ban on battery cages: Huge victory for animal welfare. *AgsScene*, 135, 10.
- Council of Europe. (1976). *Convention on the protection of animals kept for farming purposes*. Strasbourg, Belgium: Author.
- Dawkins, M. S., & Hardie, S. (1989). Space needs of laying hens. *British Poultry Science*, 30, 413–416.
- Duncan, I. J. H., Slee, G. S., Seawright, E., & Breward, J. (1989). Behavioural consequences of partial beak amputation (beak trimming) in poultry. *British Poultry Science* 30, 479–488.
- Elson, H. A. (1981). Modified cages for layers. In Universities Federation for Animal Welfare (Ed.), *Alternatives to intensive husbandry systems* (pp. 47–50). Potters Bar, England: Universities Federation for Animal Welfare.
- Elson, H. A. (1985). The economics of poultry welfare. In R. M. Wegner (Ed.), *Proceedings, 2nd European Symposium on Poultry Welfare* (pp. 244–253). Celle, Germany: World's Poultry Science Association.
- Elson, H. A. (1999). Laying cages to be enriched, not banned. *Poultry World*, August, 16.
- European Communities. (2000). *European Communities proposal: Animal welfare and trade in agriculture. WTO Committee on Agriculture, Special Session, Paper G/AG/NG/W/19*. Geneva, Switzerland: World Trade Organization.
- Farrant, J. (1999). IEC's world action to keep cages. *Poultry World*, November, 1–4.
- FAWC (Farm Animal Welfare Council). (1986). *An assessment of egg production systems*. Tolworth, England: Author.
- FAWC (Farm Animal Welfare Council). (1991). *Report on the welfare of laying hens in colony systems*. Tolworth, England: Author.
- FAWC (Farm Animal Welfare Council). (1997). *Report on the welfare of laying hens*. Tolworth, England: Author.
- Fraser, D., Weary, D. M., Pajor, E. A., & Milligan, B. N. (1997). A scientific conception of animal welfare that reflects ethical concerns. *Animal Welfare*, 6, 187–205.

- Fröhlich, E. K. F., & Oester, H. (2001). From battery cages to aviaries: 20 years of Swiss experience. In H. Oester & C. Wyss (Eds.), *Proceedings, 6th European Symposium on Poultry Welfare* (pp. 51–59). Zollikofen, Switzerland: World's Poultry Science Association.
- Gentle, M. J. (1986). Beak trimming in poultry. *World's Poultry Science Journal*, 42, 268–275.
- Gentle, M. J. (1997). Acute and chronic pain in the chicken. In P. Koene & H. J. Blokhuis (Eds.), *Proceedings, 5th European Symposium on Poultry Welfare* (pp. 5–11). Wageningen, The Netherlands: World's Poultry Science Association.
- Gibson, S. W., Dun, P., & Hughes, B. O. (1988). The performance and behaviour of laying fowls in a covered strawyard system. *Research and Development in Agriculture*, 5, 153–163.
- Harrison, R. (1964). *Animal machines*. London: Stuart.
- Hughes, B. O., & Duncan, I. J. H. (1972). The influence of strain and environmental factors upon feather pecking and cannibalism in fowls. *British Poultry Science*, 13, 525–547.
- Keeling, L. J., Hughes, B. O., & Dun, P. (1988). Performance of free range laying hens in a polythene house and their behaviour on range. *Farm Buildings Progress*, 94, 21–28.
- Ludvigsen, J. B., Empel, J., Kovacs, F., Manfredini, M., Unshelm, J., & Viso, M. (1982). Animal health and welfare. *Livestock Production Science*, 9, 65–87.
- Lymbery, P. (1999). European Parliament demands ban on battery cages. *Agscene*, 133, 5.
- MAFF (Ministry of Agriculture, Fisheries and Food). (1969). *Codes of recommendations for the welfare of livestock: Domestic fowls*. London: MAFF Publications.
- MAFF (Ministry of Agriculture, Fisheries and Food). (1987). *Codes of recommendations for the welfare of livestock: Domestic fowls*. London: MAFF Publications.
- Matter, F., & Oester, H. (1989). Hygiene and welfare implications of alternative husbandry systems for laying hens. In J. M. Faure & A. D. Mills (Eds.), *Proceedings, 3rd European Symposium on Poultry Welfare* (pp. 201–212). Tours, France: World's Poultry Science Association.
- Muir, W. M. (1996). Group selection for adaptation to multi-hen cages: Selection program and direct responses. *Poultry Science*, 75, 447–458.
- Nørgaard-Nielsen, G. (1986). *Behaviour, health and production of egg-laying hens in the Hans Kier system compared to hens on litter and in battery cages. Rapport til Hans Kier Fond, Forseningen tel Dyrenes Beskyttelse i Danmark*. Copenhagen, Denmark: Hans Kier Fond.
- Royal Society for Prevention of Cruelty to Animals. (n.d.). *Home to roost: The future for laying hens*. Horsham, England: Author.
- Sansolini, A. (1999a). Europe in brief. *Agscene*, 134, 13.
- Sansolini, A. (1999b). Italian turning point. *Agscene*, 135, 7.
- Scientific Veterinary Committee. (1996). *Report on the welfare of laying hens*. Brussels, Belgium: Commission of the European Communities Directorate-General for Agriculture VI/B/II.2.
- Sherwin, C. M. (Ed.). (1994). *Modified cages for laying hens*. Potters Bar, England: Universities Federation for Animal Welfare.
- Stevenson, P. (2000). CIWF goes to America. *Agscene*, 140, 16.
- Tarrant, P. V. (Ed.). (1983). *CEC farm animal welfare programme evaluation report 1979–1983*. Luxembourg: Commission of the European Communities.
- Tauson, R. (1984). Effects of a perch in conventional cages for laying hens. *Acta Agriculturae Scandinavica*, 34, 193–209.
- Tauson, R. (1985). Mortality in laying hens caused by differences in cage design. *Acta Agriculturae Scandinavica*, 35, 165–174.
- Tauson, R. (1986). Avoiding excessive growth of claws in caged laying hens. *Acta Agriculturae Scandinavica*, 36, 95–106.
- Tauson, R. (1988). Effects of redesign. In Cambridge Poultry Conference (Ed.), *Cages for the future* (pp. 42–69). Nottingham, England: Agricultural Development and Advisory Service.
- Tauson, R. (2000). Furnished cages and aviaries: Production and health. In *Proceedings, 21st World Poultry Congress* (pp. 8–17). Montreal, Quebec, Canada: World's Poultry Science Association.

- Tauson, R., & Holm, K. E. (2001). First furnished small group cages for laying hens in evaluation program on commercial farms in Sweden. In H. Oester & C. Wyss (Eds.), *Proceedings, 6th European Symposium on Poultry Welfare* (pp. 26–32). Zollikofen, Switzerland: World's Poultry Science Association.
- Wegner, R. M. (1990). Experience with the get-away cage system. *World's Poultry Science Journal*, 46, 41–47.
- Wolffram, R., Simons, J., Giebel, A., & Bongaerts, R. (2002). Impacts of stricter legal standards in the EU for keeping laying hens in battery cages. *World's Poultry Science Journal*, 58, 365–370.