KILLING METHODS FOR POULTRY

A report on the use of gas in the U.K. to render birds unconscious prior to slaughter.

Ian J. H. Duncan

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ANIMAL WELFARE

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My visit to the U.K. to see gas stunning in commercial operation, and the writing of this report, were requested by the Canadian Farm Animal Care Trust (CANFACT) who also provided financial support for both enterprises. I am extremely grateful to CANFACT for this support.

Ian J.H. Duncan
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A GOOD LIFE AND A PAINLESS DEATH

Report on Killing Methods for Poultry

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Introduction

Most civilised countries have humane slaughter legislation designed to ensure that all food animals are killed humanely i.e. quickly, painlessly and without the animals suffering in other ways. This usually means that the animals should be rendered unconscious before being killed by exsanguination. Some countries allow exemptions for ritual slaughter under Islamic or Judaic law. With regards to poultry, although some small processors use manual methods for stunning such as electrified knives for cutting the neck vessels (sticking), the method adopted in recent years by all the larger processors has been water-bath stunning. According to this method, the birds are unloaded from the transport system and shackled in a conscious state by the legs on a line which leads to a water bath. The shackles are arranged so that the birds’ heads pass into the bath; an electrical potential between the shackles and the bath renders the birds unconscious. Many different combinations of current, voltage and frequency are used. Shortly after leaving the stunning bath, the birds are stuck, usually automatically by a machine.

Canadian Regulations

In Canada, the Meat Inspection Act and Regulations permit the following methods for the slaughtering of poultry:

◆ the application of an electrical current in a manner that causes immediate loss of consciousness and that ensures the birds do not regain consciousness before death;

◆ electrocution;

◆ decapitation;

◆ ritual slaughter in accordance with Jewish or Islamic law.

Of these methods, electrocution has the reputation of leading to poor carcass quality and so is avoided; decapitation is unacceptable for hygiene reasons (severance of the gullet leads to gut contents contaminating the carcass); a small number of plants use ritual slaughter; the majority of plants attempt to achieve electrical stunning, but the actual frequency of use of this method is difficult if not impossible to obtain.
Concerns about Stunning Methods

The Farm Animal Welfare Council (1982) in the U.K. reviewed the welfare of poultry at the time of slaughter by inspecting slaughter plants and hearing evidence from numerous witnesses. However, it should be emphasized that they did not carry out a scientific survey. Nevertheless they concluded that as many as two-thirds of all birds being slaughtered were not properly stunned; these birds were either killed outright or not rendered unconscious.

In fact there have been very few scientific surveys of the effectiveness of commercial electrical stunning methods in rendering birds unconscious. However, in 1981 a report was published by four official veterinary surgeons appointed to supervise the slaughter, processing and packing of poultry in the U.K. (Heath et al., 1981). They expressed concern about the humaneness and effectiveness of the then current methods (which have changed little between then and now) of stunning, killing and bleeding of broiler chickens. They called for research into stunning and slaughter methods to reduce the risk of occasional birds entering the scald tank whilst still alive and conscious.

In another survey, information was collected on the slaughter procedures used in 12 processing plants in Australia (Griffiths and Purcell, 1984). They found a great range in variables such as line speed, voltage in the stunning water bath, duration of stunning and time allowed for exsanguination. As a result of these variables, some birds were dead on leaving the stunner and prior to exsanguination, whereas it was probable that others were not dead before entering the scald tank. In a review of American practices, Bilgili (1992) confirmed that there is a great range of variables associated with electrical stunning of poultry.

There is also some evidence from poultry carcasses, that all slaughter may not be humane. One of the common reasons for down-grading in the processing line is the so-called "red-skin" carcass. Harris and Carter (1977) suggested that red-skins are the results of poor slaughter techniques. Heath et al. (1983) proposed that red-skin carcasses are produced from chickens that are alive when they enter the scald tanks and this was confirmed experimentally by Griffiths (1985). It is not possible to say definitively whether or not red-skins are conscious when they enter the scald tank, but it seems likely that they are for the following reasons :-

◆ red-skins are alive when they enter the scald tank
◆ they are alive because they have not bled out
◆ the likeliest reason for not bleeding out is that they have not been cut
◆ the likeliest reason they have not been cut is that they have not been in the "stunned posture" when approaching the cutting machine
◆ the likeliest reason they have not been in the "stunned posture" is that they have not been stunned (birds which twist their necks up and manage to avoid the stunner, are capable of twisting their necks up and avoiding the cutting machine)
◆ but in any case, even if the birds were stunned but somehow avoided the cutting machine, they would probably have regained consciousness while passing through the bleed-out tunnel and so be conscious when entering the scald tank

There is therefore strong circumstantial evidence that red-skins have entered the scald tank while conscious.
In a recent philosophical review of Canadian poultry stunning practices, Boyd (1994) was very critical of all electrical stunning methods used for poultry including water-bath stunning, and called for these procedures to be investigated.

This general concern over the humaneness of poultry slaughter has sparked a great deal of research in the United Kingdom designed to (a) examine in detail the consequences of electrical stunning, and (b) develop new methods of stunning. Much of the research is reviewed in this paper. First, I deal with the problems of electrical stunning, second, I report on the development of an alternative method of gas stunning poultry, and third, I describe a visit to a commercial processing plant in the U.K. that is using this method.

Consciousness, Unconsciousness and Death

The methods used to judge the effectiveness of stunning require some description. Since we are interested in what the birds can feel, and since feelings are brain processes, the best indicators are two measures of brain function. The first is the spontaneous electrocorticogram (ECoG), which has a completely different pattern depending on whether the bird is conscious or unconscious, in an epileptiform state. EcoG, with electrodes on the surface of the brain, is considered a better measure than electroencephalogram (EEG), with electrodes on the surface of the skull, because it measures closer to the source of activity. Electrical stunning aims to induce an epileptiform episode. Generalised epileptiform activity occurs when a large number of cells in the brain fire continuously. Epileptiform activity in the brain is accompanied by a type of epileptic seizure and there is general acceptance that this is a sign of unconsciousness (Gregory, 1987). The second measure is somatosensory evoked potentials (SEPs) which measure the responsiveness of the brain to external stimuli and which disappear during unconsciousness. Both these measurements require electrodes to be attached to the bird's head (Gregory and Wotton, 1986) and so are only useful in a laboratory setting. There are also several secondary measures, such as sustained eye closure, loss of posture, time to onset and duration of tonic convulsions (sustained muscle contractions) and time to onset and duration of clonic convulsions (rapidly muscle movements), which are useful in non-laboratory settings. Convulsions, which are a type of epileptic seizure, are a very reliable indicator of unconsciousness.

After conducting a series of experiments using water-bath stunning, Gregory and Wotton (1989) concluded that there was a reasonably close association between the presence of epileptiform activity in the EEG and the absence of SEPs following electrical stunning. However, they suggested that the absence of SEPs should be preferred as an indicator of an effective stun.

Convulsions also occur when the brain is disconnected from the body (decapitation or neck dislocation) or during anoxia (lack of oxygen in a tissue). This is because higher centres in the brain normally have an inhibitory influence, and when these are removed, the spinal cord causes the body to convulse. During anoxic episodes, the brain is affected first and loses its inhibitory effect, which allows the spinal cord to cause convulsions until it too becomes anoxic, whereupon the convulsions subside.
As with human beings, defining death is extremely difficult. However, a flat or isoelectric ECoG or EEG is usually taken as a definitive indication (Gregory, 1987). Death by exsanguination takes quite a long time in chickens. Gregory (1987) gives times of 163 seconds if both carotids are cut and 302 seconds (more than 5 minutes!) if one carotid and one jugular are cut. Death occurs much more quickly (90 seconds) if there is cardiac arrest.

**Research into Electrical Stunning of Poultry**

Some early research in the U.S. investigated the variables that gave the best bleed-out (the U.S. industry were not interested in the humaneness of the kill). Kuenzel and Ingling (1977) compared plate and water-bath stunners, A.C. (60 Hz) and D.C. voltages and various levels of voltages. They concluded that an A.C. water-bath stunner set at 50 volts gave the best bleed-out in broilers. In a later experiment, Kuenzel and Walther (1978) got even better bleed-out using high frequency (480 Hz) currents. In this experiment they made some attempt to measure the level of stun and concluded that this method was humane. Both these studies were designed *not* to cause cardiac arrest.

There have been many British investigations into the electrical variables used to stun chickens and these have been much more focussed on the humaneness of the procedures. For example, Gregory and Wotton (1987) evaluated thirteen commercial water-bath stunners for the current used, voltage used, and waveform of the current (with and without birds present). All stunners had variable voltage output which was controlled by the slaughterhouse staff. The measurements taken were extremely variable. The incidence of ventricular fibrillation (cardiac arrest — which leads to a much faster death) varied between 0 and 97.5% with an average of 40%. Half of the stunners used a 50Hz sinusoidal waveform (the frequency of the alternating electrical supply). The others had modified this waveform in some way. The mean current used was 64 mA per bird (range 37-117 mA). In an accompanying experiment, Gregory and Wotton (1987) showed that using sinusoidal waveforms and voltages within the common range used (50 – 350 volts) in commercial stunners, 148 mA was required to cause ventricular fibrillation in 99% of birds. They recommended that all waveforms should be investigated and the minimum current necessary to induce cardiac arrest with each should become the recommended current.

Part of the variation in stunning efficiency using water-bath stunners may be because of the great variation in resistivity of the skull in chickens (Woolley *et al.*, 1986a). This means that the brains of chickens may not all carry the same current in water-bath stunners. This is in contrast to the hearts of chickens which did carry similar currents in experiments (Woolley *et al.*, 1986b). Whether the feathers are wet or dry also influences the effectiveness of electrical stunning (Gregory and Wotton, 1992), but depth of immersion of the head does not (Gregory and Wotton, 1991a).

There is reluctance in the poultry industry, particularly the North American poultry industry, to cause cardiac arrest because it is thought that this results in poorer bleed-out, although this is disputed (e.g. Griffiths *et al.*, 1985). Therefore, there has been some research effort into finding a combination of electrical variables that leads to stunning without cardiac arrest.
Gregory and Wilkins (1989) found that currents that induce ventricular fibrillation in 99% of broiler chickens, can be associated with downgrading defects, particularly deep breast muscle haemorrhages, superficial leg muscle haemorrhages, wing-tip haemorrhages, shoulder haemorrhages, and broken bones in the collar region, all of which would reduce the value of the carcass. They suggested that the defects could be minimised by using currents less than 130 mA or greater than 190 mA. However, in other experiments, Gregory and Wotton (1990) found that a minimum of 105 mA was required to provide at least 52 seconds of stun but that currents greater than 120 mA were better in that they were associated with absence of SEPs for at least 60 seconds. There is, therefore, an extremely narrow range of current available that will (a) assure a good stun, and (b) minimise downgrading.

Because of the difficulties that the poultry industry would have in achieving this current under commercial conditions, Gregory looked for alternative solutions. Gregory et al. (1991) found that various high frequency currents did not cause nearly as much ventricular fibrillation as did 50 Hz currents and so would meet the bleed-out requirements. Then Gregory and Wotton (1991b) showed that a 350 Hz pulsed D.C. current of 120 mA caused 93% of birds to lose SEPs for at least 60 seconds, suggesting that this would meet humane requirements as well.

Research continues into finding the ideal combination of variables that will ensure a humane stun together with a minimum of carcass downgrading. There is some indication that high frequency, pulsed, D.C. currents may offer the best solution (e.g. Gregory et al., 1991) but at the moment a complete solution is not available. In any case, there may be other reasons why water bath stunning is unacceptable. On hygiene grounds, there is evidence that birds being stunned inhale small quantities of the contaminated stunning water which can lead to a contamination of the carcass (Gregory and Whittington, 1992). On welfare grounds there is also the problem that birds have to be shackled while conscious and this is probably a frightening and painful experience (Sparrey and Kettlewell, 1994).

Research into Gas Stunning of Poultry

For about the past 10 years, a group at Bristol in the U.K. (formerly in the AFRC Meat Research Institute, now in the Department of Meat Animal Science, School of Veterinary Science, University of Bristol) led initially by Dr. Neville Gregory and now by Dr. Mohan Raj, have been looking at the possibilities of stunning poultry using gas mixtures. The group were stimulated to investigate gas stunning (i) because of all the concerns surrounding electrical stunning, and (ii) from the fact that carbon dioxide has been used to stun pigs for many years now, although the humaneness of this particular practice is questionable. The idea of using carbon dioxide to immobilise chickens prior to slaughter is not new, but early research in the U.S. did not lead to any commercial development (Kotula et al., 1957, 1961). One of the big advantages of gaseous stunning is that birds could be stunned in their transport crates, eliminating the handling stress associated with uncrating and shackling (Sparrey and Kettlewell, 1994).
The Bristol group have searched for a gas that could either stun chickens through its own action or replace oxygen and stun the birds through anoxia or hypoxia. It was also important that the gas should have the following characteristics:
1. The birds should not find the gas aversive e.g. pungent.
2. The onset of unconsciousness should be rapid and stress-free.
3. The stun should be sufficiently long-lasting to remove any risk of birds regaining consciousness before death.
4. The gas should have no deleterious side effects on meat quality.
5. The gas should be of a rather different density (higher or lower) compared with air so that it might be easily contained in an open container. The crates could then be lowered or raised into it. For example, nitrogen would probably work extremely well, but it has exactly the same density as air (being the major component of air) and so would be difficult to contain.
6. The gas should be safe to use in industrial conditions.
7. The gas should be reasonably cheap.

In discussions with the British Oxygen Company (BOC - the biggest producers of industrial gases in the U.K.), the Bristol Group narrowed the field of potential gases down to carbon dioxide and argon. Both of these gases are considerably heavier than air and so are reasonably easy to contain. Carbon dioxide is fairly cheap and has been used to stun pigs (although there is conflicting evidence on the humaneness of this procedure). Argon is an inert gas (colourless, odourless, and tasteless) present at very low levels in air from which BOC extracts it for use in the steel industry. The British steel industry is depressed at the moment and so argon is relatively cheap (but more expensive than carbon dioxide) and BOC are looking for other markets for it.

**Humaneness of Gas Stunning**

Carbon dioxide (CO₂) at fairly high concentrations was shown to be effective in rendering both broilers and laying hens unconscious. Laying hens took a little longer than broilers to become unconscious but at concentrations of 55% CO₂, both became unconscious in 21-22 seconds. Lower concentrations of the gas took significantly longer to stun the birds. There was no advantage to a slow induction and best results were obtained when the final concentration of 55% was reached as quickly as possible (Raj and Gregory, 1990a, b). With this concentration of CO₂, EEG suppression occurred in 21 seconds and loss of SEPs occurred after 30 seconds. Convulsions occurred 15 seconds after loss of SEPs (Raj et al., 1990b).

The problem with using CO₂ is that it may be perceived as aversive and cause distress in the birds. The minimum concentration at which human volunteers experienced respiratory distress while breathing CO₂ ranged from 30-60% and to minimise the aversiveness of this gas for chickens it is suggested to be conservative and go with the 30% CO₂ (Gregory et al., 1990). At levels as low as 30%, recovery of consciousness in birds is rather fast (and too fast to be useful in a commercial processing line) leading to the recommendation that levels should be not less than 55% (Raj and Gregory, 1990b).
This problem with CO₂, that the high levels necessary for a sufficiently long stun may be very aversive, led to investigations into using anoxia (very low levels of oxygen). Anoxia was achieved by displacing air with argon. A series of studies showed that a good stun could be achieved with oxygen levels of 2% or less (Raj and Gregory, 1990b). In fact, Raj and Gregory (1990b) recommended killing the birds (by leaving them in the gas mixture for two minutes) rather than risking recovery.

Further experiments showed that a combination of anoxia (2% residual oxygen) with 30% CO₂ resulted in a loss of SEPs even faster than anoxia alone (Raj et al., 1992c; Raj, 1993). This is probably accounted for by the hypercapnic effect of the CO₂ keeping the birds breathing deeply. Exposing birds to a mixture of 5% residual oxygen and 30% CO₂ for two minutes resulted in all birds being killed, whereas there was some recovery after two minutes when CO₂ levels were lower (Raj et al., 1992a).

One of the risks in batch-stunning birds in gas, is that air may be trapped in the feathers and raise the oxygen level higher than planned. However, Raj et al. (1992d) showed that any inadvertent raising of the oxygen level up to 5% would have no significant effect on speed of stunning. They concluded that a residual level of oxygen of 2% should be aimed for, and that this would allow a considerable safety margin.

Recently it has been shown that turkeys will enter a feeding chamber containing 90% argon or 60% argon with 30% CO₂ (3% residual oxygen) whereas they will avoid a chamber containing 72% CO₂ (Raj, 1996) confirming the earlier suspicion that high levels of CO₂ are perceived as aversive, and supporting the view that high levels of argon are not.

The British Government were so convinced of the humaneness of gas stunning that they approved of two gas mixtures, 90% argon in air and a mixture of 30% CO₂ and 60% argon in air (which gives 2% residual oxygen) for stunning and killing chickens and turkeys in the United Kingdom (MAFF, 1995).

Product Quality with Gas Stunning

Raj et al. (1990a) compared bone breakage with different stunning methods. Two percent oxygen in argon gave the lowest incidence of broken bones at stunning, followed by 45% CO₂, 55% CO₂ and lastly, electrical stunning. The authors concluded that gas stunning was satisfactory in this respect but that the level of CO₂, if present, should not exceed 50%. Gas stunned broilers bled out more slowly than electrically stunned broilers over the first 60 seconds. However, there was no difference in blood loss after 140 seconds (Raj and Gregory, 1991). The authors recommend a time interval of between 60 and 140 seconds between neck cutting and scalding.

Raj and Whittington (1990) looked at the effects of time interval between stunning birds with low oxygen (0.4%), which actually killed the birds, and with CO₂ (56%) and neck cutting. The incidence of red wing-tips increased with this interval and the authors recommend that neck cutting should take occur within three minutes of stunning/killing to minimise carcass down-grading. In another study, Raj et al. (1990c) compared carcass quality of broilers stunned electrically, by 2% oxygen in argon, and by 45% CO₂.
They found that gas stunned birds had fewer muscle haemorrhages, more tender breast meat and were free of breast muscle bruises compared with electrically stunned birds.

It is thus emerging that, not only is gas stunning more humane that electrical stunning, but that there may be commercial advantages as well. These advantages also seem to hold true for further processing. For example, there is great interest in “hot filleting” of broiler carcasses to reduce the cost of storage and handling. However, “hot filleting” results in increased toughness in a large proportion of breasts, and 3-6 hours of aging prior to filleting is required for acceptable tenderness (Lyon et al., 1985). Raj et al. (1991) found that filleting at 2 hours post mortem resulted in breast muscle with acceptable texture. In comparison with electrically-stunned and electrically-stimulated broiler carcasses filleted at 2 hours post mortem, fillets from gas-stunned were rated higher by a tasting panel (Raj et al., 1992b).

Experiments are continuing into the meat quality of broilers stunned and killed by gas mixtures. All the indications are that this procedure substantially reduces meat quality defects and allows hot filleting at 4 hours post mortem without a reduction in quality (Raj et al., 1997).

Gas Stunning of Turkeys

Following up the success of gas stunning and killing of domestic fowl, there has been a series of similar experiments performed on turkeys (e.g. Raj, 1994; Raj and Gregory, 1994). The indications are that the welfare and commercial benefits of gas stunning also apply to turkeys.

Inspection of a Commercial Plant Using Gas Stunning

On Tuesday 11th February I visited the first commercial gas stunning installation in Europe at Eye, Suffolk in eastern England. I was accompanied by Dr. Mohan Raj, of Bristol University, the scientist responsible for leading all the fundamental research into gas stunning, and Barry Landymore, the Sales Director of Anglia Autoflow, the company responsible for developing and manufacturing the installation in conjunction with BOC Gases. The processing plant at Eye was originally part of the Sovereign Food Group and it was under their management that field trials were carried out. Late in 1996 Sovereign was taken over by Grampian Poultry, the largest processors in the U.K. We were met and escorted round the plant by Paul Chambers the General Manager of this site.

Anglia Autoflow have installed an extension of their Easyload containerised live bird transport system. This system consists of large frames which can hold 12 plastic drawers in four tiers. The frames + drawers are taken into broiler barns for loading. The drawers are filled with birds (perhaps 20-24 depending on bird weight) from the bottom. When the frame of drawers is filled it is loaded on to a truck by a fork-lift. At the processing plant the procedure is reversed, the drawers are removed from the frame on to a moving belt and the birds shackled from the drawers. At the Eye plant, the drawers are pushed out of the frame one at a time and lowered automatically into one end of a tunnel containing a mixture of 30% CO₂ and 60% argon in air giving a residual mixture of 8% nitrogen and 2% oxygen. The concentrations of CO₂ and oxygen are very carefully monitored throughout the tunnel and automatically replenished should the level drop.
There are dials at the observation window giving levels of argon and oxygen and these remained constant as I watched them for about 10 minutes. As each crate reaches the bottom of one end of the tunnel it is carried along on a moving belt a distance of about 15 metres which takes two minutes. At the far end, the belt slopes up allowing the gases to drain back into the tunnel.

I watched the crates through an observation window at the point where the crates were lowered and started to move along the tunnel. The birds were extremely quiet with no panic or struggling at any stage. As they entered the gas, several of the birds opened their beaks and shook their heads once or twice. After about 6-10 seconds, they gradually and very gently became prostrate. All birds were apparently unconscious and unresponsive as they disappeared along the tunnel. At some point in the intervening 2 minutes they convulsed for about 15 seconds, but this could not have been very vigorous since no sounds could be heard. When the crates emerged through a curtain at the far end all the birds were absolutely still. I did not see one movement in watching about 50 crates go by. The crates then pass in front of a shackling crew who pick up the dead birds and hang them by the legs on a shackle line.

In my opinion, this is the most stress-free, humane method of killing poultry ever developed. The birds are quiet throughout the operation. They remain in the transport crate until dead and the killing procedure itself is fast, painless and efficient. There is no risk of recovery from unconsciousness.

In addition, there are many other advantages. The environment for the shacklers is very much improved. There is no dust or noise. The area is well lit in contrast to the subdued lighting in traditional shackling bays. The position of the crates relative to the workers can be adjusted to improve the ergonomics of the job. Considering that of all poultry processing workers, the shackling crew have the biggest turn-over, these working conditions represent a big improvement.

The environment is also very safe. BOC have installed lots of monitors and alarm systems for gas leakages – but, in fact, the gases being used are extremely safe. BOC have also installed large air extractors at the point where the crates emerge from the tunnel.

Another advantage is in the improved quality of the product. Grampian Poultry are moving more and more into the cut-up and fillet market where small haemorrhages can easily cause downgrading. Paul Chambers reported a significant improvement in this area. He also said that they could use a less severe scald and still get a better pluck with gas stunning.

I asked about the problem of identifying dead-on-arrival (since every bird in the crate gets hung on the shackle line whether killed in the gas tunnel or having been dead beforehand). Apparently, these birds are very easy to spot. They do not bleed-out properly, and have a very characteristic colour after plucking. I had to wait about 15 minute to see such a bird (the broilers were coming from a good local source and there were few dead-on-arrivals) and it was very easy to pick out.

Another big advantage I see in the future is that this system lends itself to automatic hanging. There has been some interest in trying to shackle birds automatically because it is such dirty job and it is difficult to retain shacklers in the job. There are, of course, huge welfare problems in trying to shackle live birds automatically. Dead birds are a much easier engineering challenge and there is no risk to bird welfare.
The Grampian Poultry processing line at Eye is currently running at just over 6,000 birds per hour. They plan to double the capacity in the next year to about 12,000 – 13,000 birds per hour because they are so pleased with the gas stunning system. There are several other processors waiting to see what Grampian do. My prediction is that when Grampian Poultry are seen to be committed to this process, then it will take off in the U.K. in a big way.

Endorsements of Gas Stunning

During my visit to the U.K., I also had the opportunity to meet several people prominent in the animal welfare movement. They included:

- Mrs Ruth Harrison, the person who first alerted the public to animal welfare problems in agriculture in 1964 with her book *Animal Machines*, and a long-serving member of the Farm Animal Welfare Council (FAWC)

- Professor John Webster, Dean of Veterinary Medicine at Bristol University, a long-time farm animal welfare advocate, past-member of FAWC and author of the recently published *A Cool Eye Towards Eden*

- James Phillips, Chief Veterinary Officer of the Royal Society for the Prevention of Cruelty to Animals (RSPCA)

- Dr. Martin Potter, Head of the Farm Animals Department of RSPCA and current member of FAWC

They were all unanimous in their praise of the gas stunning system for poultry. All thought that it offered tremendous improvements in bird welfare compared with conventional pre-slaughter management practices (although Mrs Harrison was judging on description, not having seen the process herself). The RSPCA representatives thought that, if many processors across the country adopted gas stunning, then it may be included as mandatory for poultry in their “Freedom Food” scheme (it is acceptable at the moment but not mandatory).

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