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Mr. Dan Jørgensen
Minister of Food, Agriculture
and Fisheries of Denmark
Slotsholmsgade 12
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Paris le 23 mai 2014

Dear Minister,

May we thank you very much for your letter of April 7 in which you indicate the scientific documents justifying the ban by your government of the religious slaughter of animals.

It took us some time to properly prepare a set of answers. We went back to the original articles you cited. Indeed, the literature you cite is the most recent available on the topic.

However we came to the conclusion that none of these references demonstrates convincingly that religious slaughter causes pain to animals. None of the references you provided meets the quality criteria I emphasized in my previous letter. This is shown below.

For some articles, there is lack of information on methods used, e.g. of details on kill method practiced.

For others it is already known in the scientific literature (reviewed by a supporter of stunning) that their conclusions cannot be extrapolated to religious slaughter, because of major experimental bias.

We also sought the advice of Professor Joe Regenstein of Cornell University, who is one of the leading experts on humane slaughter. He had many reservations on the procedure and on the approach of these articles. It is impossible to take over these comments in a letter, so that we would recommend that he is audited by the Danish experts.

Please find below a table commenting some of these many shortfalls. A proper, scientific comparison of animal pain in religious slaughter and stunning processes is not yet available. We really think that the quality criteria set in our previous letter should be considered as a basis both for review of existing studies and for the design of new studies.

We have also inserted attachments supporting the view that religious slaughter, when done right, minimises animal pain.

On the other hand, stunning includes a variety of processes, which have limitations, such as a high percentage of failure and which may cause unacceptable animal suffering. In United States, in plants where procedures have been optimised in terms of animal welfare, the percentage of failures is max. 5%. Otherwise much higher figures have been reported.

All of the material that we have examined supports our initial impression that the scientific grounds for the Danish ban are actually very thin. I understand that this was not your intention, however this situation could justify the feeling of some associations and people around the world that the Danish ban was directed towards casting a negative view on some of the major Western religions.

Should we not rather envisage to promote research to evaluate and improve all slaughter methods, including those for stunning? If new research is conducted to evaluate slaughter methods (whether religious or stunning), resources should not be wasted:

- (i) In order that its findings can be extrapolated to evaluate *shehita*, any new experimental study should replicate exactly the critical conditions of this slaughter method, which have been carefully optimized centuries ago.
- (ii) Plants in which studies are made should be selected among those having already optimised their procedures in terms of animal welfare. Otherwise the study might just be give the picture of a "bad" plant.

Last, may we draw your attention on an a possible amendment which has to be debated soon in the EU Parliament. Consumers are perfectly entitled to be informed about the welfare of the animals they eat. However this information should not be reduced to "meat from an animal which has been or has not been stunned". A labelling limited to "stunned/un-stunned" would discriminate animals killed according to religious slaughter without giving the appropriate information to consumers. We hope that the MPs and yourself will support a proper information to consumers.

A proper information to consumers on animal welfare would include growth, transportation and killing. For killing it should be made clear that un-stunned animals do not suffer if the process is done right, as recognised by leading scientists. Processes with or without stunning which apply an agreed code of practice are all acceptable.

We thank you for reconsideration of your ban of religious slaughter, that we believe is based on inadequate information.

We remain at your disposal if any issue raised here needs clarification. Please be confident in the expression of our profound consideration.

Dr. Bruno Fizon
Grand Rabbin de Moselle

Dr. Alexandre Feigenbaum
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Study or paper cited	Experimental study?	Published in a peer-reviewed scientific journal?	Reported with sufficient detail to be duplicable?	Industrial plant using the best available equipment?	Addresses precisely the technique of <i>shehita</i> ?	statistical significance?	Comment
EFSA advice 2004	No	Yes	Not relevant	Not relevant	No	Not relevant	<p>Some concepts in this 2004 paper are now out of date. For instance "insensibility", i.e., essentially brain death is the wrong term: the issue that is nowadays critical is "unconsciousness", the point at which pain is no longer an issue.</p> <p>The analysis cited here has later been contradicted by the observations of Dr. Grandin who points out that when religious slaughter is done well, one doesn't see a "pain reaction"! This text of Pr. Grandin is given in the appendix.</p> <p>The literature for un-stunned slaughter that is cited is not up to the standards of religious slaughter. The challenge is to identify the details of the system of un-stunned slaughter relevant to religious slaughter.</p> <p>There is an emphasis on outliers (e.g. as shown by the word "up to" cited in your letter. This is a few animals, but is where more research is needed, while being respectful of religious requirements.</p> <p>There would be the need of an update from EFSA, answering the question "are the data available sufficient to evaluate humane methods of slaughter?" (whether religious or stunning processes, including ALL stunning processes)</p>

2

Study or paper cited	Experimental study?	Published in a peer-reviewed scientific journal?	Reported with sufficient detail to be duplicable?	Industrial plant? using the best available equipment?	Addresses precisely the technique of <i>shehita</i> ?	statistical significance?	Comment
Gregory 2012		Yes But no good description of all the kill details.	No Pr. Regenstein: <i>"Notice the absence of a description of the knife, of neck holder or any other useful information to relate it to religious slaughter. Is the tubing big enough to take the entire blood flow? Where exactly on the neck was the cut made?"</i>	Plant: Yes Best available equipment: no information available	information not available	Possible issue about pooling of data from countries having different animal welfare standards	<p>This Gregory paper is not an original study. It partly reviews some selected recent references in the area and claims that religious slaughter causes an increase in time before unconsciousness. It is oriented against religious slaughter.</p> <p>However the studies cited are not suitable for a generalisation of conclusions. Here are two reasons.</p> <p>Data from Gregory¹ were obtained in abattoirs located in different countries: UK, Belgium, France, China, Indonesia.</p> <p>(i) it is not explained how these plants were selected. Was it, as could be expected, because the procedures used had been optimised in terms of animal welfare? Otherwise how could conclusions obtained there be generalised to any slaughter process (whether religious or stunning)?</p> <p>(ii) It seems that data from the various plants were pooled. The consequence would be that good data are diluted with data obtained in plants not having the same standards. As this is not clear from the material and methods section, the authors should be audited about their statistics.</p> <p>The papers of Gibson are also cited as pivotal studies. These papers cannot be used to draw general conclusions on religious slaughter. See below the reasons. Pr. Regenstein had many more comments on the ways the studies were carried out and reported.</p>

¹ N.G. Gregory et al., Meat Science **90** (2012) 368–372. An important learning from this article is not that religious slaughter should be banned, but that high-neck cuts strongly reduce false aneurysm. High neck cut is generally recommended for religious slaughter.

Study or paper cited	Experimental study?	Published in a peer-reviewed scientific journal?	Reported with sufficient detail to be duplicable?	Industrial plant using the best available equipment?	Addresses precisely the technique of <i>shehita</i> ?	statistical significance?	Comment
Gibson (2009)		Yes	Yes	No: laboratory experiments, with high percentage of failures	No	They studied a few animals	<p>The experimental conditions used by Gibson were later shown by Dr. Grandin to be non-representative of religious slaughter.² See appendix, page 9.</p> <p>Some detailed comments by Pr. Regenstein: <i>"Gibson's work was laboratory experiments. The data from plants comes from one plant in Belgium and one "slaughterman" who went from 8% requiring in over a minute (Gregory) to become insensible down to 4% becoming insensible in over a minute (Gibson). This suggests a poorly trained slaughterman that requires additional training – and certainly one plant is not indicative of the situation in Europe. It is also a halal slaughter and no helpful details are given. It is totally inappropriate to extrapolate the results to other kosher and halal slaughters.</i></p> <p><i>Authors studied a few animals and they were using halothane gas – so they are counting on the « electrical » measurements. The head holder is also not described and it appears that the animals head was not held in place sufficiently to reflect good modern religious slaughter of animal welfare practices.</i></p> <p><i>Authors have way to few data points from the experimental animals. They admit is preliminary results (see below). And the fact that 2 of 7 stuns they undertook failed is way above the acceptable limit. So there are a lot of problems with this research."</i></p>

² <http://www.grandin.com/ritual/slaughter.without.stunning.causes.pain.html>

Study or paper cited	Experimental study?	Published in a peer-reviewed scientific journal?	Reported with sufficient detail to be duplicable?	Industrial plant ? using the best available equipment?	Addresses precisely the technique of <i>shehita</i> ?	statistical significance?	Comment
Gibson (2012)	Yes	Yes	See comments	Lab experiments. Equipment not representative of religious slaughter.			<p>The limitations cited above apply for this work of the same group.</p> <p>Here are some comments by Pr. Regenstein:</p> <p><i>"At a DialRel meeting in Gerona, Spain, Johnson, a co-author of that paper, admitted it is a preliminary study. Can a ban be based on a preliminary study that was so poorly done?"</i></p> <p><i>On page 114, concerning the use of blood pressure parameters: Some of these are suspect for this purpose -- at what blood pressure does an animal become unconscious? Mohan Rao misuses this and actually focuses on zero blood pressure which is not appropriate.</i></p> <p><i>In the section "EEG effect of noxious stimulation alone (Gibson et al 2009b)" it appears that the windpipe is not being cut -- so that does mean oxygen is available longer! The implications of this deviation from religious slaughter and its impact on the results is not discussed.</i></p> <p><i>The section Political Sequelae to Slaughter Studies (page 121) is totally out of place in a scientific paper and seems to be taken from a political agenda³"</i></p>

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³ Extract of this section: " in accord with dominant international scientific opinion (Anonymous 2001), other scientists have held that conscious (non-stunned) animals are likely to experience an unreasonable level of pain and distress during the neck incision and after it until they become insensible (e.g. Gregory 1998)."

Study or paper cited	Experimental study?	Published in a peer-reviewed scientific journal?	Reported with sufficient detail to be duplicable?	Industrial plant using the best available equipment?	Addresses precisely the technique of <i>shehita</i> ?	statistical significance?	Comment
Dialrel	Not relevant	Not relevant	Not relevant	Not relevant			<p>There was no consensus on this final report. Some authors did not agree with the final conclusions. Here a comment received by email (19 May 2014) from Pr. Ari Zifotovski, a participant of DIALREL:</p> <p><i>"It is important to note that the report gives recommendations for how to improve non-stun slaughter; I don't think that it recommends AGAINST such slaughter. Nonetheless, I was not in agreement with all the recommendations and thus you will note that I am not a co-author of the report (per my request) but I am merely thanked on the first page. You can tell that there were disagreements within the project."</i></p> <p>It should emphasized that from the 200 references cited by DIALREL, those cited by the DK Ministry in the letter of April 7 are the most relevant. however they reflect the whole situation of all these studies, suffering from major bias.</p> <p>In Diarel, it was often a postulate that stunning was "good" in terms of animal welfare, while religious methods were "bad". However there are no experimental studies meeting the quality criteria and supporting this postulate.</p> <p>This illustrates once more that an updated critical and comprehensive review (e.g. by EFSA) is needed.</p>

Appendixes: Religious slaughter and respect of animals

This section includes short texts of Joe Regenstein, Temple Grandin, Bruno Fszon and Alexandre Feigenbaum

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May 27, 2014

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***Shehita* and respect of animals (2013)**

by Bruno Fizon and Alexandre Feigenbaum, November 2013

For the *Torah*, the Jewish law, the respect for animals is a sacred principle

The respect for animals during their life and up to their death is a constant principle of the *Torah*. Let us note the ban on hunting as a leisure activity; on fights using animals, on any cruelty to animals ;to muzzle an ox and to prevent it from feeding while it is working in the fields [Deuteronomy XXV, 4]; the compulsory resting of animals during the Sabbath [Exodus XX, 10]; and the obligation to feed animals before taking one's own meal [Talmud Guitine 62a].

For centuries, Jewish religious slaughter (*shehita*) has been optimized to minimize any suffering or stress of animals

The *Torah* recognizes that humans need to consume meat, but because this is not a harmless activity, it is surrounded with rigorous rules. For many centuries, only the Jewish religious slaughter aimed at limiting any pain or stress of slaughtered animals. Today, it still is at least as effective as the other methods of slaughter of animals, i.e., the use of various stunning techniques, each of which has its own challenges.

How does the Jewish religious slaughter method limit pain and stress?

It has happened to almost everyone, that they are injured by a cut from a very sharp blade. The pain is only felt later, often after one sees the blood. This is the critical principle with *shehita*, with its very precise specifications. The animal loses consciousness before feeling the pain, the cut is made all at once, with a very sharp knife of surgical quality and totally nick free. According to Dr. Temple Grandin, the world's top expert on the study of slaughter processes, "the animal does not realize that its throat was cut⁴". The cutting of the carotid arteries and jugular veins causes a fast and massive bleeding. The blood and oxygen supplies to the brain stop very quickly and the animal then loses consciousness as blood pressure drops.

How is the goal of a humane slaughter of animals reached with *shehita*?

Two elements guarantee the optimal quality of the Jewish religious slaughter:

- The slaughterman (*shohet*) is well trained and a highly qualified technician, using through a training program of about three years that culminates with a final examination of both knowledge of the requirements and demonstration of the actual practical skills.
- If there is the slightest deviation compared with the specifications, the slaughtered animal is not kosher (not acceptable for the consumption by Jews). This requirement provides a strong motivation for the *shohet* to do things right to minimize the suffering of the animal.

⁴ T. Grandin., JM Regenstein (1994): Religious slaughter and animal welfare: a discussion for meat scientists. *Meat Focus International*, 115

Is it scientifically demonstrated that *shehita* reduces the pain of animals?

It is not easy to measure or even estimate the pain felt by an animal unless it shows active signs of such pain. The common criterion for measuring the quality of slaughter is the time for loss of consciousness. The adequacy of this criterion to evaluate *shehita* is questionable, as the process aims that the perception of pain disappears well before unconsciousness.⁵

According to INRA⁶, for sheep, unconsciousness occurs at about 14 seconds on average. DIALREL⁷ notes a case of loss of consciousness after 2 seconds for a sheep.

For cattle these figures are more variable in the literature and rarely provide sufficient information to evaluate whether a facility using best practices was evaluated. INRA mentions 36 seconds for a loss of total consciousness. Dr. Grandin's data suggests 17 to 34 seconds for plants that meet her high standard.

To evaluate slaughter according to religious rites, other more adequate criteria should be used (see section on research).

In the Jewish religious slaughter of animals the loss of consciousness is quick and until this happens, animals do not feel the pain

In 2009-2010, studies from a New Zealand research group showed that cutting the throat caused an increasing of animal suffering. These studies influenced numerous governments which limited, and in a few cases, even forbid religious slaughter. Yet it was obvious from reading the papers that the New Zealand authors had not applied the rigorous specifications of *shehita* and thus their conclusions do not apply to Jewish religious slaughter, *shehita*.⁸ Among a number of criticisms was that the knife they used was too short (would not have been acceptable for kosher slaughter) and it was machine sharpened – certainly not razor sharp without any nicks.

What about failures with the stunning of animals using conventional slaughter?

Stunning is the official default technique in many Western countries. It is supposed to anaesthetize the animal before killing. However there are many failures. The report on animal pain published by INRA in December 2009 reviews the failures of the stunning of animals before slaughter: from 2 to 54% with ovine (stunning by electronarcosis) and from 6 to 16% with cattle (stunning by cracking through the skull to knock them down). Although poorly stunned, and still conscious, these animals are brought into the production chain, where they are bled without particular precautions. Consequently, these animals undergo double suffering (bad stun and poor cut for bleeding, i.e., this knife is not kept super-sharp since the animal is presumed to be unconscious). Their agony can be really horrible. The INRA report does not specifically give details about failures with *shehita*. It can be expected that the rigorous specifications and the training of the slaughtermen tend to strongly limit these failures.

⁵ Observers may be misled by movements of legs and by accelerated breathing of the just killed animal which are reflexes and which should not be confused with signs of pain.

⁶ INRA (Institut National de la Recherche Agronomique) 2009 : Douleurs animales, Synthèse du Rapport d'expertise pp 74 & 75

⁷ DIALREL reports 2.4, October 2010: improving animal welfare during religious slaughter

<http://issuu.com/florencebergeaud-blackler/docs/dialrel-recommandations-final-edited?e=2152254/2596337>

⁸ T. Grandin, Discussion of research that shows that Kosher or Halal Slaughter without stunning causes pain, February 2010, <http://www.grandin.com/ritual/slaughter.without.stunning.causes.pain.html>

Quality of the meat produced by *shehita*

Bacteriological aspect: the detractors of *shehita* claim that there is a risk of contamination of the zone of the cut with food refluxed from the rumen (one of the four stomachs of ruminants) via the split oesophagus (food pipe). First, such an event is extremely rare. But even if it would occur, it has no influence on the quality of meat, for two main reasons:

- The oesophagus is immediately closed off by the installation of a ring preventing anything from leaving the oesophagus.
- The area of the wound is routinely removed, even when there is no food reflux.

Thus, the hygiene of animals slaughtered according to *shehita* is comparable to those of other methods of slaughter.

For those concerned with mad cow disease, *shehita* brings an additional protection to the consumer of bovine meat. Indeed the pathogenic prion is present only in the nervous system. Yet the skull penetrating stunner used for the conventional stunning is introduced into the cerebral mass and can scatter some brain tissue to other organs, which are then contaminated. This risk obviously does not exist with *shehita*, as the nervous system remains intact.

Should information of meat consumers mention whether the animal has been killed according to religious method?

Consumers may be entitled to know more about the origin and production of the meat they consume. The cost-benefit of such a program remains to be determined. Are consumers really ready to pay what it will cost to provide various types of information? But, the European authorities and some Member States seem to focus on only whether the animal was killed religiously.

There is no difference in the sanitary or bacteriological quality between meat from religious and from the different conventional slaughter methods. Furthermore, the information about the religious slaughter seems to be meant to stigmatize *shehita*, while this method is specifically designed to minimize animal pain. If it was decided to inform only about the mode of slaughter, then consumers also deserve to know which of the other four methods of slaughter were used. The governments promoting such labelling would morally be required to undertake to provide consumers with a balanced review of the pros and cons of each type of slaughter. If done fairly, we believe that more consumers would be buying kosher meat even if such meat were not required by them for religious purposes!

In 2013, in UK, during the crisis of horse meat instead of beef, British consumers bought Kosher meat, as they trusted the constant care of quality and the traceability of kosher meat.

Ranking of slaughter processes by Dr. Grandin (2014)

In an interview to ANSES (France), Dr. Grandin ranked slaughter processes. She confirmed this in an email to Pr. Regenstein, as follows:

2014/1/8 Joe Mac Regenstein <jmr9@cornell.edu>

Hi! Here is here statement. Shalom. Cheers.

Dear Joe -

The quote from France is right.

To achieve an acceptable level of animal welfare during kosher or halal slaughter without stunning requires more attention to the details of procedure than conventional slaughter with stunning.

To clarify my position, I would rank animal welfare as follows:

Excellent - Captive bolt with a well maintained gun

Acceptable - Kosher slaughter done according to my above statement

Not Acceptable - Sloppy kosher slaughter or sloppy captive bolt with a poor maintained gun

In conclusion - Maintaining acceptable standards of welfare during kosher slaughter requires more management attention to more details of procedure than captive bolt. In the U.S. I am concerned that there are still some kosher plants that have the attitude of not being committed to doing things right. At a meeting, I heard about a restraint device that was breaking bones.

Temple Grandin

Comment by AF: there is always margin to improvement. If a study had been made in the kosher plant described here by Dr. Grandin, the evaluation of the process would be very bad. Fortunately this is an outlier.

Note on Stunning and BSE (2011)

The US Department of Agriculture (USDA) has announced that amongst new regulations to prevent the spread of BSE - "Mad Cow Disease" - the use of the pneumatically charged captive-bolt stun gun, which pneumatically piths the animal, is now forbidden, since this can transmit the infection beyond the brain and spinal column. A study (known as the Harvard Study) has found that when air-injection pneumatic stunners are used, CNS (central nervous system) tissue emboli can be identified visually in the pulmonary artery and in the right ventricle of the heart and microscopically in the jugular venous blood. The US Food Safety and Inspection Service (FSIS) is amending the Federal meat inspection regulations to prohibit the use of these types of penetrative captive bolt stunning devices. The Harvard study estimates that for each BSE-infected animal stunned with a standard captive bolt stunner (without air injection) there is a 50 percent probability that a very small fraction of the brain tissue (possibly with the BSE-prion) will be transferred to the blood. Pneumatic type captive bolt stunners have a 31% probability that the brain tissue (with the BSE-prion) is transferred to the blood, heart, lung and liver.

Religious slaughter avoids the above risk by avoiding disturbing the brain.

(Based on the Federal Register, Feb. 14, 2010.)

A critical review of the publication by Gibson (2009) in the New Zealand Veterinary Journal (2010)

by Joe Regenstein (extract of report supplied in 2010 to Dutch authority)

The most recent work on un-stunned slaughter (i.e., not religious slaughter.) reported in the NZ Veterinary Journal (Gibson et al., 2009a,b,c,d) is an example of such a limited piece of work. It has many serious limitations. A list of some of those concerns is shown below:

The knife blade is rather short -- less than 10 inches long and the actual slaughter and the "pen" used for the slaughter are poorly described. The special equipment used is not shown. What about details about the actual slaughter cut -- how many strokes and where on the neck? The head holder also doesn't seem to be doing the job right -- too much movement? The training of the slaughter man is not given. Like so many of these papers, it does not give enough details about the religious slaughter (or un-stunned slaughter as they call it) to determine what really is happening, which violates the basic scientific principle that the work must be repeatable by others. (And if it is about un-stunned slaughter unrelated to religious slaughter why is religious slaughter mentioned so frequently?)

A broom stick was run gently across the animal as the supposed control. Why not use the back of the knife for a sham cut -- some pressure could be applied which would show what the impact of pressure without a cut has on the animal. This "sham cut" feels like it is no different than an untreated control. The knife was also sharpened using a mechanical knife sharpener. Who sharpens a knife with a mechanical knife sharpener?

Why is the heart rate so high for the first paper and much lower in the other two papers? It suggests that some of these animals were more stressed -- why should that be the case if the animals were not conscious? This is often observed for the convulsions after slaughter regardless of method. It also seems that the normal "sticking" of the animal after non-penetrating slaughter was never done thus this important control is missing.

They actually admit in one of the papers that the halothane might have an effect on some of the observations they have made -- my physiology is not good enough to follow all those arguments but that does raise the question of whether the methodology used for treating the animals interferes with appropriate data collection. It certainly is NOT identical to un-stunned slaughter.

The papers are VERY sloppy about how the words "unconsciousness", "insensibility", and "undoubted insensibility" are used. That is probably a key to the distortion of the discussion. The papers never actually establish an unconsciousness point, where it is accepted that the animal would not feel pain. According to the EU and common vocabulary, when the animal drops, it is unconscious and doesn't feel pain. And the papers also seem to reference a lot of the bad religious slaughter for the times they discuss with respect to time to insensibility. (Much longer than those of Dr. Grandin's recent work noted above.) Words like suffering are also thrown in to add a little drama. This is a word that needs to be defined and requires a great deal more research. It is not the same as "pain". And what exactly is psychological shock? A term used but not defined. And a lot of "wishy-washy" words, like "probably,

likely, possibly” are scattered throughout the paper that leave one uncomfortable with the strong conclusions that are being claimed by both the authors and others for the importance of these papers. *This is another concern with the use of the research literature – the results are often mixed, but the conclusions come out with strong definitive statements not supported by the research. Presumably the authors are hoping that the less scientific readers will only read the summary and/or conclusions.*

The whole business of occlusions (the issue of blood clots that prevent proper bleeding and the issue of blood being aspirated into the trachea and possibly beyond into the bronchii) seems to be muddled. Even when they occur according to these authors, they seem to have no effect on the outcome of the slaughter. They actually challenge the conclusions of others who believe this is a major issue. Dr. Grandin (personal communication) suggests that what is needed is the correlation of aspiration into the trachea and the time to drop. Also she has suggested that blood in the trachea may not elicit a response, while blood that actually goes into the bronchi before the animal is unconscious might have a negative impact. The issues of whether blood interferes with breathing in any systematic way and under what circumstances any stomach contents are expelled during slaughter is a complex issue. Especially the later is a concern for regular slaughter also where bleeding occurs after the animal is hung upside down. Clearly more work is needed to clarify these complex interactions.

The papers talk about possible errors in using the non-penetrating stunner -- what kind of experimentalists are they if they invoke "incompetence" and have a 28% failure rate of the stunner? That is considerably greater – over 5 times -- than the 5% that is acceptable for slaughter according to the AMI standards.

From a colleague more familiar with the physiological measurements:

I have yet to complete a detailed analysis of their EEG analysis but even at this stage, I would add ...that if you try to pursue the data points for single animals, especially in the attached paper, some of them have results that run in completely opposite directions and there is great overlap between the groups. I have major doubts about the statistical validity of their separability. Second, I believe that there is a considerable difference likely between the groups for movement artifacts which could per se also generate many of the differences in what is anyway a non-specific marker.

Discussion of research that shows that Kosher or Halal Slaughter without stunning causes pain (2010)

by Temple Grandin, Updated February 2010

A study done in New Zealand in 2009 shows that slaughter without stunning causes pain. A new EEG (brainwave) method was used, which can determine when an animal is feeling pain. In these experiments, lightly anesthetized calves were cut with a very sharp knife that was 24.5 cm long. The weight of the calves was 109 to 170 kg. One reason why the calves were lightly anesthetized was to prevent animal movements (movement artifact) from changing and distorting the EEG patterns. The experiments showed that the calves would have been experiencing pain during the cut (Gibson et al, 2009 ab).

The knife used in this experiment was much shorter than the special long knives that are used in Kosher slaughter. The use of a shorter knife may possibly have had an effect on the painfulness of the cut. The author has observed that shorter knives, where the tip of the knife gouges into the wound during the cut, will cause struggling. An animal may also struggle when the wound closes back over the knife during the cut. Since the calves were anesthetized, it was impossible to observe behavioral reaction during the cut. From reading the methods sections in the papers, it was not possible to determine if the wound was held open during the cut, which may help reduce pain. The knife used in this experiment was similar to many of the knives the author has observed being used for halal slaughter. The special long knife used in kosher slaughter is important. When the knife is used correctly on adult cattle, there was little or no behavioral reaction (Grandin, 1992, 1994). Barnett et al (2007) reported similar reactions in chickens. Only four chickens out of 100 had a behavioral reaction. Grandin (1994) reported that the behavioral reaction of cattle was greater when a hand was waved in their faces compared to well done Kosher slaughter. All of the cattle were extensively raised animals with a large flight zone. They were all held in an upright position in a restraint box. The results of this study clearly show that the use of a knife with a 24.5 cm long blade definitely causes pain. Another factor that may have had an effect on pain was the use of a grinding wheel to sharpen the knife instead of a whet stone. There is a need to repeat this experiment with a Kosher knife and a skilled shohet who obeys all the Kosher rules for correct cutting.

Aspiration of Blood

Research also shows that cattle aspirate (inhale) blood into the lungs during Kosher and halal slaughter. This can vary from 36% to 69% (Gregory et al, 2008). The cattle were restrained in an upright position. The author has also observed aspiration of blood during Kosher and halal slaughter. It is the author's opinion that aspiration of blood is more likely to be a serious welfare problem for cattle, because bovines take longer to lose sensibility (consciousness) compared to sheep (Baldwin, 1971 and Blackmore, 1984). This provides more time for cattle to aspirate blood compared to sheep. Sheep lose sensibility more quickly due to differences in their blood vessel anatomy compared to cattle (Baldwin, 1971; Baldwin and Bell, 1963). See other articles on www.grandin.com on slaughter methods. The Gregory et al. (2008) data was collected in commercial slaughter plants. Further research is needed to determine why some cattle aspirated blood and others did not. Possibly, improving procedures to facilitate rapid loss of sensibility may reduce aspiration of blood. This needs further research.

All of this research needs to be looked at in the perspective of the entire process. Abusive handling practices prior to slaughter and highly stressful methods of restraint may cause more suffering than the

actual slaughter itself. The author has been in dreadful places where large, 600 kg cattle were hung up by one leg and they were all thrashing and bellowing. The OIE slaughter standards state that these stressful methods of restraint should not be used. Plants that use stressful methods of restraint such as shackling and hoisting or shackling and dragging need to stop using these abusive methods.

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Maximizing Animal Welfare in Kosher Slaughter (2011)

by Temple Grandin, The Jewish Daily Forward, issue of May 06, 2011.

There are legislative attempts around the world to require stunning of animals prior to religious slaughter. I do not get involved in the politics of this issue, but the following discussion may help clarify where there are problem areas.

Over the past 30 years I have worked closely with the kosher industry to ensure that religious slaughter is performed in as humane a manner as possible. The issue of stunning, in my view, is not the most important issue when it comes to ensuring the welfare of animals before they are slaughtered. But it is critical to recognize that performing kosher slaughter with an acceptable level of welfare *does* require more attention to the procedure's details than slaughter in which the animal is stunned.

There are two animal welfare issues when slaughter is performed without stunning. They are the method used to restrain the animal and the throat cut itself.

These issues are particularly relevant when it comes to cattle. Poultry can be slaughtered easily with a sharp knife, and there is no need for stunning. Sheep are smaller than cattle and easier to restrain and kill quickly. A lamb that is slaughtered with a sharp knife out on the farm, even without stunning, probably has better welfare than a lamb that has to ride on a truck to a slaughter plant. Due to anatomical differences in the blood vessels in the neck, cattle take twice as long as sheep to lose consciousness after the cut, and their size makes them difficult to restrain.

Some of the worst animal welfare problems in the kosher industry are the stressful methods of restraint that are still being used in some slaughterhouses. In the United States, there are still some kosher plants that hoist conscious animals by one rear leg. Fortunately, most of the large American kosher plants have stopped using this traumatic method.

In South American kosher slaughterhouses, however, the handling practices are often atrocious. The live cattle are shackled and dragged and then held down by several people. The methods of restraint are so bad that it is impossible to determine how the animal is reacting to the throat cut. Large amounts of kosher beef are imported into this country from plants that are using these barbaric methods of restraint.

Even when a plant has decent restraint equipment to hold the animal in a more comfortable position, it needs to be operated correctly. This requires management that is committed to good animal treatment.

I have observed that when kosher slaughter of cattle is done well, there is almost no reaction from the animal when the throat is cut. Flicking my hand near the animal's face caused a bigger reaction. When the cut is done well, 90% or more of the cattle will collapse and become unconscious within 30 seconds.

There are new scientific studies that show there are welfare concerns when animals are slaughtered without stunning. New Zealand researchers conducted a study on calves with a new EEG brain wave method that indicated that the knife cut caused pain. In this study, however, they used a machine-sharpened knife that may have been too short. A knife that is

too short will cause gouging of the wound. The results of this study clearly show that the knife they used was not acceptable. To this date, a similar study has not been done with the special long kosher knife.

Another study has shown that one of the most difficult welfare problems to solve is aspiration (inhaling) of blood into the lungs after the cut. Cattle continue to breathe after the throat is cut. There is much variation in the percentage of animals that aspirate blood. It may be possible to improve methods and reduce this problem. Aspiration of blood is an issue that must be fixed to have an acceptable level of welfare. It will require both research and practical experimentation with technique to solve this problem.

Finally, there needs to be accountability to ensure that both restraint and slaughter are done correctly. Over the years, I have become disgusted by the frequency with which procedures in a given plant seem perfect when I am visiting, but as soon as I have left an undercover video surfaces that reveals bad practices. This has happened in both conventional and religious slaughter plants.

To prevent this problem, I am a big advocate of video auditing over the Internet. An outside auditing company can view video from a plant and evaluate its practices using an objective scoring system. Some of the variables that can be measured are electric prod use, percentage of cattle vocalizing (bellowing) and acts of abuse. Video auditing is now being used in many large, conventional slaughter plants. Unfortunately, all kosher plants [in the US] have resisted video auditing.

Kosher slaughter of cattle requires special care. While some kosher plants have done well, and many others are improving, too often kosher plants have been very badly managed compared to many of the big conventional plants.

In order to maximize animal welfare, kosher slaughterhouses need to take the following steps: 1) eliminate stressful cruel methods of restraint such as dragging, shackling and hoisting or leg clamping; 2) keep animals calm before slaughter, since an agitated animal is more difficult to kill and takes longer to become unconscious; 3) perform the cut immediately after an animal's head is restrained; 4) use restraining devices that hold animals in a comfortable upright position; 5) perform collapse scoring to keep track of the proportion of animals that quickly lose consciousness; 6) use video auditing by an outside firm, and practice transparency by streaming the video to a webpage so that the public can view it.

Adhering to these practices would enhance animal welfare, and all these steps could be implemented without transgressing the requirements of religious law. The kosher industry has an opportunity to show the world that it is doing things the right way.

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