T R A N S C R I P T

LEGISLATIVE COUNCIL ECONOMY AND INFRASTRUCTURE COMMITTEE

Inquiry into Pig Welfare in Victoria

Melbourne – Tuesday 26 March 2024

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WITNESS

Professor Paul Hemsworth, Animal Welfare Science Centre, University of Melbourne.

The ACTING CHAIR (Katherine Copsey): I declare open the Legislative Council Economy and Infrastructure Committee's public hearing for the Inquiry into Pig Welfare in Victoria. Please ensure that mobile phones have been switched to silent and that background noise is minimised.

I would like to begin this hearing by respectfully acknowledging the Aboriginal peoples, the traditional custodians of the various lands we are gathered on today, and pay my respects to their ancestors, elders and families. I particularly welcome any elders or community members who are here today to impart their knowledge of this issue to the committee or who are watching the broadcast of these proceedings. Welcome to any members of the public who are watching along online.

I will now invite our committee members to introduce themselves, starting with Mrs McArthur.

Bev McARTHUR: Bev McArthur, Western Victoria Region.

Gaelle BROAD: Hi, I am Gaelle Broad, Member for Northern Victoria.

The ACTING CHAIR: Katherine Copsey, Member for Southern Metropolitan.

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All evidence is being recorded. You will be provided with a proof version of the transcript following the hearing. Transcripts will ultimately be made public and posted on the committee's website.

For the Hansard record, can you please state your name and any organisation you are appearing on behalf of.

Paul HEMSWORTH: Paul Hemsworth, Animal Welfare Science Centre, University of Melbourne.

The ACTING CHAIR: Fantastic. Thank you, Dr Hemsworth? Professor Hemsworth?

Paul HEMSWORTH: Either. Paul.

The ACTING CHAIR: Thank you very much. We welcome your opening comments but ask that they be kept to a maximum of 10 to 15 minutes to ensure we have plenty of time for questions and discussion.

Paul HEMSWORTH: I am not certain what you would like to hear, but I thought I would just describe a little bit about what I do and some of the findings associated with the research that I have been involved in. I have spent most of my adult life studying animal welfare. My background is animal behaviour and stress physiology. Apart from my PhD, my research basically started as a postdoc in the Netherlands, and I will just talk a little bit about that because that demonstrates where some of the research that I have been doing and still am doing originated from. I went to the Netherlands as a post doc. I was invited to study animal behaviour across a range of farms all owned by the same breeding and nutritional company, a huge Dutch company.

All the breeding farms were very similar in terms of size, genetics, facility design, nutrition and veterinary advice. The only difference was the person managing each of these breeding farms, yet their reproductive performance varied dramatically from farm to farm. It was my role really to try to identify some of the factors that might be associated with that variation. In moving around those farms it became fairly obvious that there was a difference between farms in the behavioural response of the breeding sows to my presence, so I just developed a couple of simple tests to look at how they responded to humans. Then I looked at the relationship between their response to humans and their reproductive performance, and the response that I was basically looking at was their fear response to an unfamiliar person in an arena or to a human approaching them in a standardised manner. I found a very significant relationship between their fear response and their reproductive

performance, and that basically started, what is it, about 40 years of research looking at the human–animal relationship.

That work started in the pig industry in the Netherlands but then in Australia and in the USA. Most of the work has been done in Australia. I worked with psychologists and stress physiologists. We did a substantial number of studies, both experiments in an experimental setting and studies in commercial settings, and those studies clearly indicated that there is variation in how the animals respond to humans that cannot be explained in terms of farm characteristics or genetics. I will cut to the chase quickly. We did a series of experiments looking at inducing variation in fear responses in both young pigs and adult pigs, and we studied their behaviour in terms of how they responded and how they behaved in a range of situations. We also looked at their stress physiology, and we looked at their productivity. In situations where they were handled poorly, and it was moderate poor behaviour, there were fear responses, there were stress responses and productivity was reduced. That was in experimental settings.

We then conducted a series of studies in the industry looking at, firstly, the relationship between fear responses and reproductive performance of the animals. We then started to look at the stockperson, because it was obvious the stockperson was probably implicated in this at that stage. We looked at the behaviour of the stockperson, and we also looked at the attitude of the stockperson towards working with animals; for example, working with the pigs. The key attitudes that we looked at were the beliefs around working and handling pigs, beliefs about how much control the stockperson has in working with pigs and the sorts of normative pressures that are on the stockperson to behave in a particular manner. They were the key components of attitudes that we looked at.

We studied the behaviour of the stockpeople over many days at each of these farms, a large number of farms. We assessed the fear responses of the breeding sows and we looked at the reproductive performance of the animals, and we found a very significant relationship between attitudes, behaviour, fear and productivity. In our experimental studies we demonstrated fairly clearly that where there were high fear responses to humans – and this is a specific response we are talking about; we are not talking about fear of unfamiliarity or novelty, neophobia, we are talking about fear of humans; it is a stimulus-specific response – where there were high levels of fear of humans, there was generally a stress response. Initially it was an acute stress response, and if the human behaviour or the human contact continued, you would get a chronic stress response. Corticosteroids were elevated – so the main glucocorticoid or corticosteroid in pigs is cortisol – and they were elevated in the long-term. That was fine. What can we do about that? I worked with a very prominent psychologist in the livestock industry, Professor Grahame Coleman, and we developed an intervention program where we targeted those attitudes that were associated with poor behaviour. Now, this poor behaviour is not overt cruelty; it is actually using behaviours that are moderately fear provoking but using them regularly and very rarely using positive behaviours, such as slow movement, talking to the animal, patting the animal when the opportunity arises – not going out of your way to pat the animal but patting it when the opportunity arises. We developed a cognitive behavioural intervention program where we targeted those key attitudes that were associated with those behaviours that were associated with high-fear responses. We conducted a large study – in fact we did two studies – where we looked at whether or not we could intervene using a cognitive behavioural intervention program where we targeted those key attitudes that were associated with those behaviours that were fear provoking if they were used frequently, and we were able to change attitudes, behaviour, fear and productivity.

Since then we have done work in abattoirs looking at using a cognitive behavioural intervention program to target improvements in the behaviour of stockpeople at pig abattoirs. We have just recently been involved in a collaborative study in Sweden looking at transport drivers and how they handle pigs, and again we introduced a cognitive behavioural program. It was done on a much smaller scale than what we have done in Australia, but we found that we were able to improve the attitudes and behaviour of transport drivers that are handling pigs.

Now, that work on pigs led to similar research in the dairy industry, and we have a similar program, a cognitive behavioural intervention program, that is targeting those attitudes in the dairy industry that are associated with those behaviours or patterns of behaviours that are associated with high fear responses in dairy cows. We conducted a very substantial intervention program in the dairy industry. We looked at a hundred dairy farms in Victoria and New South Wales, and we were able to successfully change attitudes and behaviours. We saw reductions in fear, we saw improvements in milk yield and we saw reductions in cortisol concentrations in the milk. That early pig work has led to a range of studies in other industries that have resulted in this so-called ProHand, professional handling of pigs, package. That has probably consumed about 60 per cent of my

research life. I am also interested in housing and husbandry practices, and I have worked in the pig industry, in the dairy industry, in the sheep industry and in the cattle industry looking at some of those housing, handling and husbandry practices. That is a bit about me.

The ACTING CHAIR: Wonderful, thank you. We will now take some time for each committee member to ask questions, and we will start with Mrs Broad.

Gaelle BROAD: Thank you very much. We really appreciate your contribution today. Can you tell us a little bit more about the ProHand? How long does it take for people to get trained in it? How widely are you seeing it taken up across the industry?

Paul HEMSWORTH: Okay. It took a while to get it developed – I mean, several decades actually – to the point where we had the program. That program in the pig industry is being rolled out, and it has been rolled out 2006. My understanding is that there is wide acceptance of that program, and the feedback that I get from people that are close to the industry is that a large proportion of stockpeople in the Australian pig industry have been through ProHand pigs.

A little bit about the program: it is a multimedia program. It is delivered individually to stockpeople. They sit down in front of a computer, and they go through a series of sections where the case is built around the importance of this topic. The stockpeople also answer a confidential questionnaire that provides us with information on their attitudes. The stockpeople get feedback on their attitudes in terms of where there are opportunities to improve. They can appreciate where they sit relative to the industry, because the database is quite substantial in terms of attitude information on stockpeople in the Australian pig industry and elsewhere, and they are provided with advice on how they can change their attitudes. The emphasis is that attitudes are learned, right? They are not enduring in terms of – you are born with them, for example. They are learned, so you can change them, and you can learn to change your attitudes by practice – by trying, thinking about how you are handling the animal, trying to impose those sorts of handling guidelines and looking at how the animal responds. How the animal responds provides feedback on those new attitudes and behaviours that you start to use, so it becomes a self-reinforcing process. I think it is widely used in Australia. You might need to speak to some of the pig industry people. Recently a large company in Canada who have 500 stockpeople put all of their stockpeople through the program.

Gaelle BROAD: Okay. So you are saying Canada. Have you seen it taken up in other parts?

Paul HEMSWORTH: In some states in the US. We tried to introduce it into Europe, but that really fell over because there was not a champion to promote it. I mean, it is difficult to get across I think at times. People think it is like, 'Oh, pat a pig and you'll have an improvement.' It is much more sophisticated than that. You need time I think to promote the program. But once you start promoting the program it should be self-sufficient.

Gaelle BROAD: Can you tell us a bit about what specific science-based evidence or research the Animal Welfare Science Centre relies on to inform its work with the pig industry and to shape recommendations or guidelines related to pig welfare?

Paul HEMSWORTH: What sort of work that the centre has done? Okay. We have done quite a lot of work, for example, on group housing of sows, and in fact I think our work on group housing of sows – the space requirements for breeding sows – has probably influenced standards and guidelines around the world. So that was a huge study – two large papers, thousands of animals involved – looking at the effects of floor space on aggression, injuries, stress, reproductive performance et cetera. So that is a good example of science that can actually provide industry information on what is important in terms of not only improving welfare but also maintaining high reproductive performance in a breeding animal.

Gaelle BROAD: And do you have any comment too on local government's role in the housing? We have heard glimpses of those developments and infrastructure needs, but do you have any comment on local government and their role in the housing approvals?

Paul HEMSWORTH: I do not think local government has a role in terms of animal welfare, does it?

The ACTING CHAIR: Probably only in relation to planning.

Gaelle BROAD: In relation to the planning – but yes, I guess we heard it was quite challenging. For some people it can change between councils. But if that is not something that you –

Paul HEMSWORTH: No, outside my knowledge base.

Gaelle BROAD: No, that is fine. Because you have travelled extensively and you have worked overseas, what is your view on the Victorian industry when it comes to pigs? How do we fare compared to the rest of the world?

Paul HEMSWORTH: I think the Australian pig industry is a very innovative industry. I mean, I was sitting here at the previous presentation, and I agree with what was said in terms of – the industry is very interested in science. Uptake I think is very good in the Australian pig industry. I think the standards that I see – I do not get around as much as, say, extension people or veterinarians in the industry, but my impression is that the standards are very good, compared to, for example, what I have seen in the US and even what I have seen in Europe at times.

Gaelle BROAD: Can you tell us a little bit about the funding for your research centre? We have also heard earlier witnesses talk about producer levies and that contribution, but how does that work in the world of research?

Paul HEMSWORTH: Okay, right. When I first started in this area it was very difficult to get research funding for animal welfare, and really it was the pig industry alone – it was not called Australian Pork Limited then – who were very bold in funding this sort of work, so a lot of our research in the past has been funded by APL or its predecessors. We also get Australian Research Council grants. We are also involved in the cooperative research centre projects on tail biting, for example. Some of our group is involved in the epidemiological work. Our group is involved in looking at some of the behavioural indicators of tail biting to try to understand what some of the early warning symptoms of tail biting may be.

You might have to shut me up in a minute, but we have just finished a really interesting Australian Research Council project looking at the effects of early housing and early positive human contact, and I heard a discussion a little bit earlier about not handling young pigs too much. We looked at, and we had done some earlier work looking at, the effects of humans on the behavioural responses of pigs to humans later in life, and it seems to be fairly enduring, that response – if you handle them positively early on, that is a fairly enduring response, although you can undo it by poor handling. Our positive human contact early in life was just five days a week for three weeks of lactation where the handler entered the pen, and if the piglets approached, the piglets would be spoken to. The handler would generally crouch to encourage approach, talk to the piglets and pat, stroke and scratch the piglets – if they wanted it. So that was a treatment that was imposed. It takes a little bit of time, but it is a good opportunity for the stockperson to become very familiar with the pigs and the situation in which the pigs are being managed et cetera. That treatment resulted in a reduction in the stress response at weaning. It resulted in a range of reductions in stress responses later in life. We had two major studies show that it also was associated with an improvement in meat quality at slaughter. So what that treatment is doing, I believe, it is a form of enrichment. We heard a little bit about enrichment before, and enrichment is all about providing animals with something that is attractive and that the animal can manipulate, but enrichment also results in stress resilience – your ability to deal with stressors. So that positive handling treatment, and there are a series of papers being published at the moment, has resulted in stress resilience in those piglets in terms of how they respond to weaning, how they respond to isolation at times when they have to be separated and weighed and how they respond to stockpeople.

The ACTING CHAIR: Do you have one more question for now?

Gaelle BROAD: That is fine.

The ACTING CHAIR: I can come back to you for another round, so I will ask a couple now. Thank you. I am interested in some of the work that you mentioned. I understand the centre has done some work on preventing tail docking and tail removal. Is that something that you can speak to a little bit?

Paul HEMSWORTH: We have done some research on tail docking. We collaborated with one of the large pork producers to do two substantial experiments looking at the effects of tail docking in terms of the behavioural response, particularly those behaviours that are associated with stress as well as the stress

physiology of those animals. Those two studies indicated quite clearly there is an acute stress response, but it is short term. So for a day or two you will see behavioural changes, and you will see some changes in their stress physiology that indicate it is a short-term moderate acute stressor, but it is a stressor. The work the centre is currently doing is looking at some of those indicators, those behavioural indicators, that there may be an outbreak of tail biting. There are a series of experiments being done in industry with the use of video cameras where the pigs are being observed in terms of their behaviour in relation to the commencement of tail biting. Also, the centre is involved in that epidemiological study, where there are something like 80,000 pigs involved – is that right? It is almost a million pigs, and one of my PhD students is doing the epidemiological study.

The ACTING CHAIR: So am I correct in understanding the work that is looking into what factors lead to tail biting and therefore how those factors might be minimised so that you can reduce the need for that surgical intervention is ongoing?

Paul HEMSWORTH: Yes.

The ACTING CHAIR: Do you have any insight as to when those studies will be available or what the current plan is?

Paul HEMSWORTH: They are underway at the moment. There is a postdoc working on that element of research. I think within a year or so we should see results.

The ACTING CHAIR: Great, thank you.

Paul HEMSWORTH: But look, that is a really difficult topic, tail biting. It is multifactorial, obviously, and there are a range of stress levels – maybe just a slight change in environment, a disruption in feeding, the feeder goes off or whatever. The Europeans and others have been working on that for decades.

The ACTING CHAIR: Thank you. To the extent to which you can comment to it, is it commonly a stress thing? I asked the previous witnesses about density of pigs. What are the sorts of factors in the ether that can contribute to it occurring?

Paul HEMSWORTH: We do not know, but I think it is a complex of things that are involved. It is multifactorial, and the fact that it can occur in indoor systems, in outdoor systems, in varying space allowances with various feeding systems with various group sizes – I mean, it might be a range of things, like a temperature change, a humidity change. Maybe the feeder line broke down for half an hour or so, or maybe there was a disruption to the water line.

The ACTING CHAIR: Thank you.

Paul HEMSWORTH: Sorry, I think in the epidemiological study, some of the factors they are looking at – I think there are about 90-odd factors that they are looking at in that epidemiological study. They are being recorded basically on a daily basis to try to associate the factors that may be associated with an outbreak of tail biting.

The ACTING CHAIR: Great, thank you. That is very interesting. I wanted to ask as well if you have done any work looking at confinement measures. Gestation stalls – we have heard that there has been a really strong move away from those within the industry, and farrowing crates and mating stalls, boar stalls.

Paul HEMSWORTH: Okay. There is a lot there.

The ACTING CHAIR: Yes.

Paul HEMSWORTH: We will start with mating stalls. We did a study a number of years ago looking at comparing sows that were weaned into groups to sows weaned into stalls. We looked at their stress response early after weaning, and the stress response in the group-housed sows was certainly elevated compared to those in stalls, and that is probably associated with mixing unfamiliar pigs, which does occur when the sows are removed from their farrowing accommodation and mixed with other pigs, other sows. We also looked at the stress response following insemination after those sows that had been in stalls were then grouped shortly after mating and those sows that had been in groups then were put into groups after mating, and there was no

difference in their stress physiology. So on that basis one would say that if you are going to wean sows, if you are interested in reducing the stress response, you probably should wean them into mating stalls.

The ACTING CHAIR: I am interested in the purpose of farrowing stalls but also the dimensions of farrowing stalls. One of the things that we have been hearing is around a welfare objective that pigs are able to stand and stretch and move around or turn around in a stall. What are the factors that lead to really small stalls? Why would that be done?

Paul HEMSWORTH: Well, I think sows have got bigger over time, but there has been quite a lot of work done comparing firstly sows in farrowing crates versus unrestrained in pens, with or without enrichment, as well as the effects of those two housing systems. They can vary a lot. The farrowing crates will vary in size, flooring type et cetera, and the farrowing pens will vary in terms of total space and whether or not there is enrichment et cetera. It is complicated, but my understanding of the literature – and we have just written a review on this topic – is that when you put sows into farrowing crates there is an acute stress response. In sows there does not appear to be a difference in the magnitude of the acute stress response as compared to sows going into farrowing pens. There is quite a bit of variability in both systems, but there is no significant difference in the majority of studies that have been done on that acute stress response of sows going into farrowing crates versus those in farrowing pens.

The ACTING CHAIR: Huts or pens. Yes.

Paul HEMSWORTH: It is a little bit different with gilts. They are first-litter sows; they are having their first litter. They do show a greater acute stress response when they go into a farrowing crate, but it is short lived. We see increases in cortisol concentrations. It is complicated, because cortisol is also important in terms of the reproductive process, so it is hard to interpret that, but certainly it is significantly greater in gilts that go into farrowing crates versus gilts that go into farrowing pens. We have looked at stress physiology throughout lactation, and I think the normal duration of lactation in the pig industry internationally is around three weeks or a little bit less. It varies a bit; I think some countries go out a little bit further. But we have seen no difference in stress physiology of gilts from day 1 to 21 of lactation in farrowing crates versus farrowing pens. However, if you take it beyond 21 days of lactation and go out to 28 days, there is evidence, mainly in gilts, that there may be a chronic stress response with a four-week lactation.

The ACTING CHAIR: With a crate.

Paul HEMSWORTH: With a crate.

The ACTING CHAIR: Yes. I understand. Thank you.

Paul HEMSWORTH: It is more complicated than that. I mean, the issue is that piglet mortality in farrowing pens is generally higher. Farrowing crates have some disadvantages too, but the beauty of farrowing crates is that they reduce live-born piglet mortality generally – that is, piglets dying in the first few days after birth. The farrowing crate in very early lactation probably does not create a great challenge, based on what we have seen in the literature and what we have seen as well, because the sow, normally, in the early part of lactation is fairly immobile. She remains in her nest with the young. It is after three, four, five days that she starts to move out, so that confinement early on is probably not a substantial issue for the sow.

The ACTING CHAIR: Yes, but you are seeing differences becoming a bit more pronounced if there is a longer term.

Paul HEMSWORTH: Four weeks. Yes. Now, there are only a few studies that indicate that, and one of those is one of our early studies with gilts. But I do not think that is a common practice in the industry. I might be wrong.

The ACTING CHAIR: Thank you. Right. Mrs McArthur.

Bev McARTHUR: Thank you, Professor. This has been fascinating. Full disclosure – I am on a beef farm, and I have to say that I do not know whether we have embarked on the ProHand development process, but certainly we do everything possible to keep the cattle calm and de-stressed. From weaning they are handled by the manager, and therefore they are quiet when they move out into the paddock. Noise is reduced – no dogs, no

noisy bikes, no horses galloping around – and the transportation of them is done by specific carriers that have very good protocols. We reduce the stress in the animal; therefore the meat is far more highly sought after. Clearly your work for the pig industry – thanks to the pig industry – might have transported itself into the beef industry. I know also, horses can sense fear from somebody that is not confident in dealing with them very easily, and they react very quickly. I am fascinated how it is working in the pig industry. Just to go on from that, given that fear transposed to the animal from a human is a factor, what happens when trespassers move onto a farm or into a piggery or wherever – strangers entering a place who are unfamiliar obviously to the pigs? What is that stress factor?

Paul HEMSWORTH: I would expect just with the change in routine, particularly if it is at night with lights on, all of that, you would get an acute stress response in those animals.

Bev McARTHUR: What happens then?

Paul HEMSWORTH: Well, inducing fear like that in itself is a welfare issue. There may not be any chronic effects, long-term effects, but there may be injuries involved in animals trying to escape. I mean, if it is in the farrowing shed, you may be getting sows standing up and crushing piglets, for example. There are concerns about that, particularly if the routine is atypical.

Bev McARTHUR: Yes, right. Can you also clarify the ProHand development issue? We heard previously that the handling of piglets – picking them up – was not a good idea. But you have suggested gently talking to them and patting them at their level is a positive approach. What is the difference between picking them up and your ProHand development approach?

Paul HEMSWORTH: Look, a good example of the impact of capturing a piglet and restraining a piglet is some of the work that has been done looking at the effects of tail docking and castration – which is a much more substantial acute stressor than tail docking. Castration can last for 24 hours or more in terms of changes in cortisol and even beyond in terms of behaviour, so it is much more substantial, than tail docking. But in studies that have been done it appears that the handling per se, the capture per se, is probably equivalent in impact to the procedure that is imposed.

Bev McARTHUR: Right. To be avoided then.

Paul HEMSWORTH: So the idea of minimising that capture is probably important. Now if those animals have been handled positively, they are more likely to respond less adversely to that capture.

Bev McARTHUR: Right. Why is housing pigs in sheds good for animal welfare?

Paul HEMSWORTH: If you have got the design right, it is the same as an outdoor system. If you have got the design right, the management right and the handling right, the welfare should be good or not at risk.

Bev McARTHUR: What are the positive aspects of it?

Paul HEMSWORTH: Of indoor housing?

Bev McARTHUR: Yes.

Paul HEMSWORTH: Well, this applies to a lot of the industries. One of the advantages of intensive industries – that is, where there is regular contact between people and animals – is that there is the opportunity for observation of the animal. There is the opportunity to identify welfare risks, for example. injuries or extreme fear responses, as well as appreciating the environment in which you are keeping the animal. Are there any issues in terms of that environment? That is one of the advantages of intensive animal production.

In the outdoor production systems there is also regular contact. They are small scale, generally. There are acres and acres depending on the size of the farm, but there is the opportunity to interact regularly and to monitor the behaviour of the animal, the injury status of the animal and the conditions. You can get high welfare in both systems.

Bev McARTHUR: Right. We have heard from a vast array of scientists, and I agree: I think we heard before and I did mention in a previous hearing that I have never seen so many PhD people in the room at any one time, so well done to the pig industry. But how do scientists maintain their independence?

Paul HEMSWORTH: Well, I mean, you are taught – you are actually taught – at a university level to be rigorous in whatever you do, whether it is observation, whether it is recording and whether it is interpreting.

Bev McARTHUR: Right.

Paul HEMSWORTH: That is in any area of science.

Bev McARTHUR: You mentioned you have got some PhD students in the Animal Welfare Science Centre at the University of Melbourne. Is there an increasing interest in this area of research?

Paul HEMSWORTH: We generally do not have a shortage of undergraduates interested in doing postgraduate studies.

Bev McARTHUR: And the industry is very accommodating and welcoming of all your research and involvement?

Paul HEMSWORTH: Yes. I do not have any problems with industry in terms of extending that information to industry.

Bev McARTHUR: Where else in the world is the research being done at the level you are doing it?

Paul HEMSWORTH: Oh, there are plenty of other very good groups internationally – Europe, North America.

Bev McARTHUR: And you all, I imagine, sort of liaise about what you are doing?

Paul HEMSWORTH: Yes, there is close collaboration. It is a smaller group than some of the other disciplines. There are some very good conferences. The International Society for Applied Ethology, which focuses predominantly on animal welfare, has been going for – I think they are about to celebrate their 50th anniversary. There is a group called WAFL, which is also interested in welfare on farm. They are annual conferences that most of the animal welfare scientists in Australia will try to attend whenever they can.

Bev McARTHUR: What are some of the future priorities for research that the centre aims to pursue in advancing pig welfare practices?

Paul HEMSWORTH: Good question. I think there are things that we need to improve our knowledge on. I heard some of the discussion around CO_2 stunning. It is like everything: there is continuous improvement as our knowledge improves. Space for the growing animal – that is quite contentious. Some Europeans have identified desirable space allowances, but my understanding is that it is not – I had better be careful here – well grounded in science. But I think we need to understand the effects of space on the growing pig in terms of the pig's welfare. That is an issue. I think we do need to look further at the slaughter of pigs – and that is in all industries, actually, it is not just in pigs. There is quite a bit of work being done in Europe at the moment looking at alternatives to CO_2 stunning, carbon dioxide stunning. One of the interesting things there is, I think, the contribution of handling prior to slaughter on the stress response of the animal to stunning per se.

Bev McARTHUR: Yes. Have there been any recent research findings or projects undertaken by your centre that have contributed to the advancements of pig welfare practices? Can you point to them?

Paul HEMSWORTH: Okay. Well, I have mentioned a couple: stall or group housing post weaning; space allowance for gestating sows – that research has been important I think internationally in terms of the international pig industry moving from gestation stalls to group housing; ProHand is another example.

Bev McARTHUR: ProHand, yes. Do pigs get bored?

Paul HEMSWORTH: Yes.

Bev McARTHUR: Is that a factor in tail biting, potentially?

Paul HEMSWORTH: I do not know.

Bev McARTHUR: It might be a subject for another –

Paul HEMSWORTH: I mean, enrichment –

Bev McARTHUR: One of the 90 issues.

Paul HEMSWORTH: The fact that we see tail biting in complex environments, like environments where enrichment is provided – you cannot explain tail biting based on boredom in that situation. Outdoor pig production – that is probably not a boring environment for the pig, and indoor systems are not necessarily a boring environment either. I mean, the environment changes regularly, with people coming and going. People are an important part of the environment. Pigs are very aware of people in their environment. Change is occurring all the time; the animals are moving and moving from pen to pen. They are being mixed at times. They are having litters.

Bev McARTHUR: Sometimes horses chew each other's tails as well. They do not bite their tails, but –

Paul HEMSWORTH: They crib-bite and wind suck – stereotypic.

Bev McARTHUR: Thank you, Chair.

The ACTING CHAIR: That is okay. I want to see, Ms Broad, if you have any more questions – one or two?

Gaelle BROAD: Yes, that is fine, thank you. I am just interested: how does the centre collaborate with industry and regulatory bodies to advance animal welfare? How do you work with them?

Paul HEMSWORTH: Well, some of our research is funded by industry, for example, through APL or the cooperative research centre, which is a joint industry and science collaboration. We publish in scientific journals. We appear at industry conferences, for example, to talk about the latest research. We contribute at times to articles in the popular press. We interact with industry. We interact with APL. We interact with government, at times, or government agents.

Gaelle BROAD: So it is kind of a sharing of information that goes backwards and forwards to shape some of your – yes.

Paul HEMSWORTH: Yes, it is a two-way street – we understand the problems from interacting with industry, with us trying to identify or solve those problems.

Gaelle BROAD: I am just interested because this is an inquiry looking at recommendations and findings. Are there any particular things that you think would be beneficial for the report?

Paul HEMSWORTH: In terms of?

Gaelle BROAD: Just any particular findings or recommendations that you would like to see for animal welfare.

Paul HEMSWORTH: Perhaps in some other industries –

Gaelle BROAD: Further investment in research.

Paul HEMSWORTH: Yes. Well, that is a joint thing, it is industry and government, not just government. Look, I get funded by a number of industries: MLA, Dairy Australia. I do zoo work, looking at human–animal relationships. I think there are lots of areas beyond the pig industry where research is needed.

Gaelle BROAD: We heard other witnesses just mentioning that Victoria does not really have a level playing field when it comes to the industry, compared to internationally. What are your thoughts on that?

Paul HEMSWORTH: Yes. Look, I do not know enough about limitations. I mean, there are some restrictions, I think, in terms of – I mean, the industry gets less subsidy than in Europe, for example, and

Canada as well. So I think that makes it hard for the industry to be competitive, but I think the industry is competitive in terms of its efficiency of production. Whether it is efficiency of growth of the pig or efficiency of reproduction, I think the Australian pig industry is quite efficient, even with those obstacles.

Gaelle BROAD: So industry is very efficient but does a lot of the heavy lifting when it comes to being a successful industry in Australia?

Paul HEMSWORTH: I think it does, yes, more than pull its weight. That is my impression.

Gaelle BROAD: Thank you.

The ACTING CHAIR: I have one more question, and then I will see if Mrs McArthur has a final one before we let you go this afternoon. I am interested in, from your research, how workers in pig production can be supported to improve animal welfare. Obviously you have got a specific training program in ProHand, but in your experience, what are some of the barriers for the workforce in ensuring that high animal welfare standards are met?

Paul HEMSWORTH: I think in any industry having training opportunities – and ProHand is only a part of it; there is also technical training et cetera, occupational health and safety training. There is a whole range of training requirements that industry needs. What was the question again?

The ACTING CHAIR: That is a very good start. Thank you. I was just asking: what are the barriers to workers maintaining high animal welfare standards? I am particularly interested in –

Paul HEMSWORTH: Sorry to interrupt, but opportunities for that training, opportunities for promotion, on-the-job training.

The ACTING CHAIR: Career pathways and skills improvement, yes.

Paul HEMSWORTH: Yes.

The ACTING CHAIR: We have heard a little bit from some other witnesses and submissions about the very nature of the work and having to undertake activities that were they not occurring in an agricultural context would be cruelty to animals, so amputations and dockings and all that sort of thing. How does having to undertake that sort of work affect people's relationship with the animal?

Paul HEMSWORTH: Yes. I think that is a challenge at times: having to do something that may be done in the interests of the animal, just like euthanasia of very seriously injured animals. That is a challenge. But I mean that is where training, including things like ProHand, is important in appreciating that those sorts of activities are in the interests of the animal, the interests of the welfare of the animal.

The ACTING CHAIR: Mrs McArthur, did you have a final question?

Bev McARTHUR: Is the industry a good industry?

Paul HEMSWORTH: I think the Australian livestock industry is a good industry. They all have opportunities to improve. From my perspective, I think the pig industry has been very progressive here in Australia in terms of not only funding research but also extending that information. I think the industry itself – the producers and the people that work in the industry – is very progressive compared to some of the other industries. It is a small industry; perhaps it is easier.

Bev McARTHUR: Well, it is the second most consumed source of protein next to chicken meat, so it must be doing something right.

Paul HEMSWORTH: Yes. I do not mind pork, as long as it is humanely produced.

The ACTING CHAIR: Professor Hemsworth, that takes us about to time. Thank you very much for attending today and providing your answers to the inquiry.

Witness withdrew.