

1 ROYAL COMMISSION OF INQUIRY  
2 ON GENETIC MODIFICATION  
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8 Commission: Sir Thomas Eichelbaum (Chair)  
9 The Rt Rev Richard Randerson  
10 Dr Jean S Fleming  
11 Dr Jacqueline S Te M Allan  
12

13  
14 Mr John Upton QC, Counsel  
15 Assisting the Commission  
16

17  
18 Ms Therese McLeod (Clerk)  
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21  
22 Stenographer: Ms Rawinia Hauraki  
23

24 Scopist: Ms Katherine O'Brien  
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30 Kingston Street  
31 Auckland  
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1 PRESENTATION BY SAFE (CONTINUED)

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3 [Video link with England established]

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5 CHAIR: Dr Holland, can you see us?

6

7 DR HOLLAND: Yes, in the distance.

8

9 CHAIR: In the distance is the Commission. I'm the Chair, Thomas  
10 Eichelbaum. On my right is Bishop Randerson, on my immediate left  
11 Dr Fleming and on my far left Dr Alan, and we're looking forward to  
12 hearing from you.

13

14 DR HOLLAND: Hello.

15

16 CHAIR: So, we're looking forward to hearing from you, and you've got  
17 the floor.

18

19

20 \*\*\*

21

22

23 DR HOLLAND: Thank you. Well, I gather that I should speak to my  
24 submission for about 15 minutes.

25

26 CHAIR: Yes, thank you.

27

28 DR HOLLAND: So, that is what I shall do. To begin with I was trying to  
29 set out some simple grand moves for our discussion here.

30

31 Particularly I wish to stress the particular genetically modified  
32 organisms that I wish to focus on are sentient mammals. And my  
33 point here is that the sentience of these mammals is of crucial  
34 importance, and I think that in view of that sentience there has to  
35 be a presumption against invasion of the lives of these animals,  
36 just a presumption, you understand, not of course necessarily a  
37 complete ban.

37

38 In other words, it does seem to me to follow from the psychological  
39 and social characteristics of these creatures that no human has  
40 simply a right to treat such beings in any way that we like; that  
41 any intervention, any invasion surely needs justification, and it  
42 also further seems to me that this view is fully grounded in  
43 science, it can be fully defended by appeal to a Darwinian, let us  
44 say a camp of the nature of these animals and of human relations  
45 with them.

46

47 It would be extraordinary after all if although close in all sorts  
48 of anatomical and physiological ways there were not also

1 considerable psychological and sociological overlaps. Therefore,  
2 for example, I don't take seriously the criticism that one is being  
3 anthropomorphic if one speaks of these animals as, oh I don't know,  
4 showing curiosity, having needs of various kinds, and so on. I  
5 would add to what I said in my submission that a further  
6 characteristic of these creatures is that they are organisms. That  
7 is to say, they are whole beings, and this, it seems to me, means  
8 further that they should not be treated as perhaps mechanisms,  
9 mechanical things, things that we can ideally pull apart as it were  
10 or disaggregate; that, it seems to me, would be to treat them  
11 inappropriately. I was hoping that that might be agreed by -  
12 those sorts of points might be agreed by all parties to the  
13 discussion. I think if people do not agree with that, I'm not  
14 quite sure that anything that I go on to say would have any impact.

15

16 My next point I think is that, I see science not as a separate  
17 operation, a separate enterprise, but as an integral element of  
18 society. Science sits within society, therefore it seems to me  
19 perfectly proper that scientific endeavour should be --

20

21 [Technical failure]

22

23 CHAIR: Professor, you were just in the middle of a sentence that  
24 started "science sits within society".

25

26 DR HOLLAND: Thank you very much Chair. I will come to the point there,  
27 which is that my perspective does not involve encouraging a  
28 separation between science and society, and in particular I think  
29 I'd want to stress that I would wish to have no part in a sort of  
30 "us/them" scenario. It seems to me that scientists act on behalf  
31 of society in an important sense, and we therefore together and  
32 collectively have an interest in and hold a responsibility for what  
33 scientists do. That is my sort of background picture of things.

34

35 Let me move on next to the issue of justification, and how one  
36 might justify proceeding along the track of genetic modification as  
37 this concerns sentient mammals in particular. I recognise that an  
38 argument that will possibly sway many people will be what I call an  
39 argument from current practice, namely if we already, for example,  
40 kill so many animals for food, what possible reason could there be  
41 for raising objections to their use as genetically modified  
42 organisms.

43

44 I suggest that that argument does need close inspection and that on  
45 inspection it isn't quite - it isn't satisfactory as I remarked  
46 there are fates worse than death, and we are dealing here with, I  
47 think, quality of life issues; and particularly if one is thinking  
48 of the quality of the lives of sentient mammals as live in

1 intensive farming systems. I would have thought that there is now  
2 a general view that the lives of these animals is not satisfactory.

3  
4 So, at the very least, it seems to me, if one were to use the lives  
5 of animals and the quality of those lives as lived in agricultural  
6 production, one ought, even to meet current unease and concerns,  
7 think of the quality of life of animals in extensive agricultural  
8 systems. So, it would seem to me at the very minimum that those  
9 are the standards of animal welfare that should be applicable.

10  
11 I would like to add another point there, that in fact the appeals  
12 to current practice is not, of course, safe in itself because it  
13 does of course assume that current practice is justified.

14  
15 If I could very briefly offer a diversion, an example of a cycle  
16 ride, a tandem cycle ride in fact that I and my wife undertook  
17 recently. Winter, snow on the ground, no snow in the valleys, we  
18 cycle a favourite route, we get up high, we begin to encounter  
19 snow, we reflect - we've come so far there is sufficient reason to  
20 continue; we continue, it gets worse, we reason we have come thus  
21 far there is sufficient reason to continue and so on and so forth.

22  
23 I'm just making the point that one can indeed, by appealing to  
24 where you have got to, justify a total cycle ride which was in fact  
25 a complete disaster. That is to say, the whole set of events when  
26 they add up can be reflected on and even when you think when some  
27 of the early stages in retrospect were ill advised. I think  
28 something like that might also be true when we appeal to current  
29 practice as a basis to arguing to the legitimacy of genetic  
30 modification.

31  
32 The other point that I addressed on the justification issue, the  
33 arguments from vital needs. This, of course, is the argument that,  
34 yes, certainly animals may well suffer if they undergo genetic  
35 modification, and if that becomes a well-established and entrenched  
36 practice, but we're dealing here with the lesser of two evils.

37  
38 I make the point that we actually use this argument rather  
39 selectively and that we don't in fact always think that it carries  
40 weight, because in fact we do condone practices which we know will  
41 threaten vital human beings. So, further argument I think is  
42 needed to show why we don't reign in some of those other less than  
43 vital human interests which are served at the expense of vital  
44 human needs when we do propose imposing on the vital needs of  
45 animals. It seems to me that there is considerable work of  
46 justification that is needed if we go down that path.

47  
48 Another additional point; when this argument is put forward, it is

1 sometimes called the argument from necessity, and you will find a  
2 version of this argument in a recent book called Lives in Need in  
3 the Balance. Sorry I don't have the authors with me, but it's a  
4 fairly recent book addressing these issues. And they use examples  
5 like the life boat example where they claim that if a life boat is  
6 full, someone is trying to get on board, one might be legitimately  
7 justified in turning that person away showing, you know, that we do  
8 make difficult choices.

9  
10 Indeed we do, but the problem with that argument is that it is not  
11 like the argument for proceeding with the invasion of animal lives.  
12 Because in those sorts of case, the argument for necessity may  
13 indeed apply. The fact is that, if we don't perhaps turn the  
14 person away, everyone is going to perish, including the person who  
15 is turned away, and that, of course, is just not the case with  
16 research on animals; the animals could live or indeed not live  
17 lives whereas they mightn't even exist, that they could live  
18 otherwise. So it seems to me that that argument also is a  
19 difficult one to make good.

20  
21 I don't want to impose on you trying too much; I will go fairly  
22 swiftly through section 3 of my submission about applications  
23 because I do wish to get to my final point, which I call the  
24 argument from naturalness, which I would like to expand on a little  
25 more than I do in my submission.

26  
27 But, just touching the main points of my section 3 on applications;  
28 I note that potential agricultural applications of genetic  
29 modification, the techniques of genetic modification that are aimed  
30 at enhancing productivity or quality, do strike me as extremely  
31 dubious because agricultural animals particularly are well-known to  
32 be up against their physiological limits, and this I think is a  
33 well documented fact.

34  
35 More interesting perhaps are potential applications of the  
36 techniques which are alleged to be capable of improving the lives  
37 and conditions of, for example, agricultural animals.

38  
39 Now, this seems to me to be extremely suspect, this argument. For  
40 this reason I will try to sum it up. The argument supposes that  
41 the conditions of agricultural animals are unsatisfactory,  
42 otherwise it would not be proposing genetic modification as a way  
43 of dealing with "the problem". So, there is recognised to be a  
44 problem.

45  
46 The approach to the problem which genetic technology proposes  
47 clearly does not involve changing the environments of these  
48 creatures, it clearly involves changing the creatures themselves.

1 Now, as I argue in my submission, the main problem really that we  
2 all face, and, of course, the animals faced with contemplating the  
3 genetic modification of sentient mammals, is their sentience. That  
4 is why we are uncomfortable I think about a lot of the conditions  
5 under which animals are kept.

6  
7 So, it seems to me that it is obviously inevitable that the lines  
8 of solution that will be proposed to this problem of sensitivity is  
9 precisely to desensitising animals; that just seems to me clearly  
10 the logical route that this technique and the application of this  
11 technique will take.

12  
13 Now, my comments on that route, one can sort of think about this  
14 for a long time I'm sure, but I just had two comments I would like  
15 to reinforce. One is that, I think that this may well strike many  
16 people as, how can I put it - or how I do put it, a life designing  
17 application of the technology. And, this is paradoxical because it  
18 is paraded under the label of improving the lives and conditions of  
19 animals, it's paraded as a positive intervention. My point is,  
20 that it's likely to be, according to my argument, a far from  
21 positive intervention.

22  
23 The other point that I make is that, this whole line of argument  
24 rests broadly on a utilitarian philosophy, and as such it is  
25 profoundly incoherent. I do wish to stress that point, and I would  
26 stress it against any fellow philosophers who wish to take issue  
27 with me and who perhaps might subscribe to utilitarian approach to  
28 things. If there was unease in the first place, it was no doubt  
29 partly based on utilitarian considerations, the suffering of the  
30 animals.

31  
32 But, if you go down the path of desensitising animals, you are  
33 falling foul of the other main planning of utilitarianism which is,  
34 of course, to promote satisfactions. You are in effect decreasing  
35 the opportunities for animals to achieve satisfaction and,  
36 therefore, you are going against the utilitarian philosophy, so you  
37 are using the utilitarian philosophy to undermine the utilitarian  
38 philosophy and this seems to me a really incoherent position. So,  
39 I do regard these potential applications as, philosophically, just  
40 indefensible, not just ethically. It seems to me they're  
41 conceptually incoherent.

42  
43 My other point there is about the uncertainty of the effects. I  
44 have in mind sciences such as allometry which show clearly that if  
45 you start tampering with an organism's, and so forth, anatomy,  
46 there will be compensatory events elsewhere. And even where your  
47 interventions might not involve desensitising or anything like  
48 that, they might involve trying to make a creature more hardy, for

1 example, thickening the wool of sheep or whatever it might be. It  
2 seems to me that, according to general principles of anatomy and  
3 physiology, there are likely to be unpredictable and compensatory  
4 changes. So I think the effects of such interventions would be  
5 uncertain.

6  
7 My other discussion applications concerns the medical applications  
8 and very briefly I just point out that the intervention of genetic  
9 techniques into this area will really dramatically reverse. What  
10 many people see as gains that have been achieved over the last 20  
11 or 30 years in terms of the reduction of numbers of animals  
12 involved in experimental techniques and also the achievement of the  
13 so-called three R's, reduction, refinement and the replacement of  
14 animal subjects.

15  
16 I acknowledge that there may well be some applications of  
17 technology which can be thought of as benign, and the criterion I  
18 would use there would be the extent to which the animal is still  
19 capable of expressing its nature; and perhaps, I don't know, the  
20 manufacture of Factor 9 in sheep's milk still does enable the  
21 animal to express its nature. So far as any arguments I put  
22 forward so far are concerned, I do not have a case to make against  
23 those sorts of applications.

24  
25 However, when we turn to, not benign but it seems to me malign  
26 applications, especially potential applications for modelling some  
27 of the more appalling of human afflictions, we face the problem of  
28 animal sensitivity in a really acute form, and we face the  
29 prospect, as I understand it, perhaps of genetic modification to  
30 produce decerebrate animals. Well, I think there is a great  
31 discussion one could have there, particularly about the, what we  
32 might call the dignity of the animals and the effect this would  
33 have, aside from my previous arguments about how this is incoherent  
34 according to a utilitarian philosophy.

35  
36 I suggest my own sort of proposal of the criteria which might be  
37 used in approaching this technology, I don't take an all or nothing  
38 stance; just to remind you, I suggest that any proposed genetic  
39 modification of non-human mammals stands in need of justification.  
40 And, I suggest the justification must be called upon to show how  
41 the proposed modification takes account of the animal's sensitivity  
42 and how it's compatible with its continuing to be able to express  
43 its naturally evolved nature.

44  
45 So, I do try to make a positive suggestion about how we might  
46 approach these very difficult and complex matters. Trying to carry  
47 out that principle would involve paying attention to a number of  
48 factors. I'm going to try to be clever with my technology here and

1 change to the board on which I have written one or two things, and  
2 I will just try now to switch over there.

3  
4 Have you got it? I don't know whether you can read it, but I'm  
5 just suggesting that what needs to happen here is that, so genetic  
6 - for genetically modified animals one needs to pay particular  
7 attention of the possibility of untoward effects, the possibility  
8 of long-term effects, the possibility of effects in later  
9 generations, the possibility of unprecedented kinds of effect, and  
10 last but not least in the light of the luminous rabbits or hare  
11 that has recently made the news, the potential for frivolity. I'm  
12 just indicating there some of the extra things that need to be  
13 taken account of. So, I would support Safe's suggestion that maybe  
14 some special Commission or something of the sort would need to be  
15 in place to overlook this new form of technology.

16  
17 If I may just for the last couple of minutes or so finally deal  
18 with the argument from naturalness. As I pointed out, I think for  
19 ordinary people this is one of the main sorts of concern. For  
20 professionals, I think, the argument tends to be dismissed regarded  
21 as worthless. I just wish to suggest that the argument is in fact  
22 far from worthless, that there is a great deal of commonsense in  
23 the idea that we should pay attention to naturalness as something  
24 which we are all, I think, interested in keeping in existence on  
25 our planet, in our biosphere.

26  
27 The problem that the critics see is that is the difficulty of  
28 identifying naturalness in the required sense. That seems to me  
29 that this is far from difficult, it's not so difficult as the  
30 critics make out, you simply have to pay attention to Darwin,  
31 simply have to pay attention to the distinguishing between natural  
32 selection and artificial selection. It seems to me that there is a  
33 perfectly easily articulated aim that people have in mind when they  
34 speak about protecting nature, protecting the naturalness of  
35 things, and this is protecting the process of natural selection.

36  
37 And it seems to me that Darwin himself showed that the process of  
38 natural selection is a quite distinctive process, and what he  
39 showed was, assuming one follows him, is that it is not a  
40 teleological process. That is to say, the events which lead to the  
41 genetic modifications naturally are, in random, in connection with  
42 their suitability with their environment. That is the sense in  
43 which natural selection is a random process. It is, of course,  
44 leading to a random process, it is a half random process. What I  
45 mean by a random process is, as I say, which brings about the  
46 variations in a given population and the various environmental  
47 circumstances which make some of these variations suitable and  
48 others not.

1

2 Genetic modification goes against that because it introduces  
3 precisely the teleological component, it starts to make a  
4 connection between suitability for the environment and the kinds of  
5 variations, the kinds of modifications which are introduced into  
6 the gene pool.

7

8 Now, of course you may think that there is a big debate to be had  
9 about whether it is a good thing to do this or whether it is not a  
10 good thing to do this, my point is simply that there is a clear  
11 logical distinction and furthermore that it is a logical  
12 distinction that potentially can matter a great deal. After all,  
13 when Darwin suggested that actually the biosphere is not defined  
14 but is the result of natural selection, it created an enormous  
15 brouhaha, people - it did make a huge difference.

16

17 So, insofar as genetic modification's involved telling you exactly  
18 the opposite, that is potentially converting a process of natural  
19 selection, which has served us well, it has after all produced  
20 human nature as we know it, it does seem an enormous and momentous  
21 step for, you know, just a few people, representatives of a tiny  
22 minority, of a tiny species, numerically speaking on the planet at  
23 a particular point in time to take it upon themselves to begin to  
24 intervene in the process of natural selection which has shaped the  
25 biosphere. I do believe there are extremely profound issues here.  
26 So, thank you, I will stop there. I hope I have not gone on for  
27 too long.

28

29 CHAIR: Thank you very much professor. Now, there will be some  
30 questions for you in a moment.

31

32 DR HOLLAND: Thank you.

33

34 CHAIR: Mr Hodson, you wish to cross-examine?

35

36 MR HODSON QC: Yes please, sir.

37

38 CHAIR: Well now, we will have to limit time. Mr Reese how long is this  
39 link for?

40

41 MR REESE: I think as long as we like, at least until 11.30.

42

43 MR HODSON QC: Two or three minutes, sir.

44

45 CHAIR: Yes, we'll need to finish before 11.30 with this witness, but  
46 thank you Mr Hodson, will you proceed then?

47

48

1 \*\*\*

2

3 [10.00am]

4 MR HODSON QC: Professor Holland, can you hear me?

5

6 DR HOLLAND: Yes, just.

7

8 DR HOLLAND: Is that any better? I'll move to a better place.

9

10 [Mr Hodson moves position]

11

12 DR HOLLAND: I've discovered that I can turn up my volume, so.

13

14 MR HODSON QC: You may now be able to see me and hear me.

15

16 DR HOLLAND: Yes, thank you, yes.

17

18 MR HODSON QC: My name is Hodson and I'm a barrister instructed by the  
19 Life Sciences Network, and I just want to put one situation to you  
20 for your comment. And that's in connection with your last point  
21 relating to the naturalness argument.

22

23 The production of insulin, as I understand it, insulin is produced  
24 either by extracting it from pigs which involves the death of the  
25 pig, or by a process of genetic engineering. It's a very necessary  
26 substance. Would you like to comment on the issues the  
27 alternatives raise?

28

29 DR HOLLAND: I'm at a loss a little bit about the facts, but my  
30 understanding of the facts of this case is that, the attempts to  
31 use engineered forms of human insulin have proved unsatisfactory,  
32 is that right? And, the --

33

34 MR HODSON QC: No --

35

36 DR HOLLAND: The use of pigs to produce insulin have proved more  
37 satisfactory. Am I right about the facts there?

38

39 MR HODSON QC: No. As I understand the facts, until about 20 years ago  
40 insulin was extracted from pigs. Since then insulin has been  
41 genetically engineered, but for about 10% of the diabetic patients  
42 the genetically engineered insulin is not suitable, and for a small  
43 number of other patients the pig produced insulin is not suitable.

44

45 DR HOLLAND: So, is the suggestion then that we might still contemplate  
46 using pigs because the humanly engineered - you know, for patients  
47 for whom the human engineered insulin is not satisfactory. I mean,  
48 is that the suggestion behind your question?

1

2 MR HODSON QC: No, the suggestion behind my question is that the  
3 alternatives seem to be to produce a genetically engineered  
4 artificial medicine, or to kill pigs to produce one which would be  
5 regarded perhaps as natural.

6

7 DR HOLLAND: Oh, I at last get your point.

8

9 MR HODSON QC: Thank you.

10

11 DR HOLLAND: So, the point I think is that - the one I would make, or  
12 the comment I would make is that, the artificiality of the insulin  
13 that is not produced from pigs does not seem to me at any rate in  
14 particular to threaten the process of natural selection. And, it -  
15 yeah, it therefore seems to me that, that would be a case I think  
16 in which - I don't think I could see any particular objection to  
17 the use of genetic modification. As I say, I think I was not  
18 taking an all or nothing stance here, and I sort of acknowledge  
19 various applications, used carefully and not in a sort of run away  
20 mode, which may indeed, for the particular circumstances of the  
21 case, prove to be defensible.

22

23 MR HODSON QC: Thank you very much professor, that was my question, and  
24 you have answered it.

25

26 DR HOLLAND: Thank you.

27

28 CHAIR: Mr Forman, do you have some questions?

29

30 MR FORMAN: No, I don't have any questions from me.

31

32

33 \*\*\*

34

35 [10.07am]

36

36 MR UPTON: Yes, Professor, my name's John Upton and I should be in the  
37 bottom right-hand corner of your screen hopefully.

38

39 DR HOLLAND: Hello, I can see you.

40

41 MR UPTON: I've got one topic I wish to put to you and that relates to  
42 the regulatory structures. Have you by any chance seen the  
43 New Zealand legislation that deals with animal welfare? Now,  
44 specifically, our Animal Welfare Act.

45

46 DR HOLLAND: I'm afraid that I have not. I was hoping to brief myself  
47 rather better, and do some background reading of that kind, but I'm  
48 afraid I haven't had the time. But, is there some feature of it

1 that you wish to discuss?

2

3 MR UPTON: Yes, I just wanted to briefly touch on some of the components  
4 that are contained in it and just talk in general terms about what  
5 you would see as an appropriate regulatory structure.

6

7 DR HOLLAND: Right.

8

9 MR UPTON: Because obviously someone has to make the decision in any  
10 given case.

11

12 DR HOLLAND: Sure.

13

14 MR UPTON: Presumably you would visualise some structure of ethical  
15 committees or a national ethical body that would deal with the  
16 issues we're discussing today.

17

18 DR HOLLAND: No.

19

20 MR UPTON: Right-o, well, you tell me what you'd visualise.

21

22 DR HOLLAND: I am very suspicious of ethical committees. It does not  
23 seem appropriate in many instances to delegate in that sense  
24 ethical decisions. I think more in terms of a regulatory structure  
25 which would set parameters, I think, and these are not so difficult  
26 to imagine, because clearly we do have the parameter that says that  
27 we do not do any serious sort of genetic modification of human  
28 beings. You know, that sort of parameter is in place. It seems to  
29 me that one could imagine a more circumscribed set of parameters  
30 perhaps enshrined in some way in legislation.

31

32 I am really quite conscious that scientists who wish to pursue  
33 knowledge require freedom of operation, and I think I would not be  
34 wishing to advocate a kind of democratisation or ethicisation, in the  
35 narrow sense, of research projects. However, it does seem to me  
36 that if some broad regulatory boundaries and parameters are set,  
37 one could seriously modify the direction of medical research.

38

39 I mean, my claim would be that, it would be naive to imagine that  
40 the research that is actually being done is the only research that  
41 could be done. The research that is actually being done is a  
42 product of a whole variety of social forces, bits of legislation,  
43 research grants, research committees, commercial interests and so  
44 forth, it's a melee, and it seems to me that there are all sorts of  
45 alternative pathways that science could take.

46

47 So I'm minded so much of an ethical committee but an ethical  
48 informed committee. I mean I hate the idea of science and ethics.

1 I trust scientists themselves to be ethical. And it seems to me  
2 that rather there should be a committee of ethical scientists if  
3 you will, or maybe some legislation that is informed by such a  
4 committee, which is able to set some parameters and which, in my  
5 view, ought in fact to turn the direction of research questions, if  
6 you will, away from increasing involvement of sentient mammals.  
7 Because it seems to me that there are so many interesting and  
8 fascinating questions and fascinating research topics that can well  
9 be forwarded without that particular sort of genetic modification  
10 being involved.

11  
12 MR UPTON: Yep, thank you.

13  
14 DR HOLLAND: I don't know if that's --

15  
16 MR UPTON: No, that's very helpful. Would you visualise Codes of  
17 Practice being laid down? Codes of conduct?

18  
19 DR HOLLAND: Yes, I'm sorry, there is, of course, a time gap between  
20 replies, I apologise. I do believe that there is a place for such  
21 codes, and obviously no doubt some narrower representative  
22 committee might be commissioned to perhaps put forward some  
23 suggestions about such a code.

24  
25 My impression is, I do talk to scientists, that they would actually  
26 perhaps welcome a greater degree of guidance in this area so that  
27 they themselves were clearer about what the ground rules are. That  
28 at least is my impression from talking with scientists.

29  
30 MR UPTON: Yes, thank you Professor, that was all the questions that I  
31 had as Counsel Assisting the Commission.

32  
33 DR HOLLAND: Thank you.

34  
35  
36 \*\*\*

37  
38 [10.13am]

39 CHAIR: Professor, there may be one or two questions from the  
40 Commissioners. I just want to follow-up the topic that Mr Upton  
41 raised with you a moment ago.

42  
43 You are in favour of parameters, legislative parameters, and in  
44 answer to earlier questions you also accepted that there could be  
45 exceptions. For example you referred to insulin, although that's  
46 perhaps not quite in point. But, if there are to be exceptions to  
47 parameters, who would make that decision, would you suggest?  
48

1 DR HOLLAND: My assumption is - well, I guess that for any set of  
2 parameters or guide, you know, rules, guidelines, there are going  
3 to be exceptions. So, I take your point. I would hope that the  
4 guidelines or the parameters would be sensitively drawn so as to  
5 minimise that happening, but of course I accept that that is bound  
6 to happen.

7  
8 As with the UK, I could imagine such a committee as I serve on in  
9 the UK, the Animal Procedures Committee, which does indeed see it,  
10 if you like, to the fine-tuning of the operation of an Act. And,  
11 therefore, in a sense, performs just precisely that role. Any  
12 active legislation such as, for example, in the UK, the Animals  
13 Scientific Procedures Act, has to be interpreted by the  
14 inspectorate and there is a committee which oversees that  
15 inspectorate to which I belong. And that committee incidentally is  
16 made up of a whole mixture of people, includes many research  
17 scientists, it includes lawyers such as yourself, it includes one  
18 or two philosophers, such as me, and that I think would be the way  
19 in which perhaps exceptions might be handled.

20  
21 CHAIR: Professor, thank you very much, that is the end of our session  
22 with you, and we do appreciate that you've made yourself available  
23 and added to our debate. It's been a pleasure to talk to you and  
24 to have you at this meeting.

25  
26 DR HOLLAND: Well, thank you also, and thank you for your courtesy and  
27 your time.

28  
29 [Video link ended]

30  
31 MR REESE: Sorry, there will be no other cross-examination at the end of  
32 Michael Morris' presentation, you won't require any further  
33 cross-examination? I thought we were going to leave him on at the  
34 end of the session.

35  
36 CHAIR: That's up to you.

37  
38 MR REESE: Certainly that was the plan, I think.

39  
40 CHAIR: Well, we can get him back. Sorry, I thought he was to be  
41 switched off at this stage, but we can certainly have him present.  
42 I didn't envisage that there would be any further questions in this  
43 formal way, but there may be points that you may wish to point to  
44 him.

45  
46 MR REESE: It's only for cross-examination, if there were any further  
47 cross-examination, it may be - that may be best answered to  
48 Dr Holland.

1

2 CHAIR: It's really over to you, it's your link. The Commission's  
3 perfectly happy to have him back online, if that's what you prefer.

4

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[10.17am]

9

DR MORRIS: In my submissions I make some points that Professor Holland  
10 just made, that prescriptively we should not be using sentient  
11 animals and I make the point there was descriptive ethic as well as  
12 prescriptive effort. In other words, the requirements of a  
13 regulatory body is not to decide what should be done, but to  
14 interpret the wishes of the public as they stand. And I've argued  
15 both the descriptive and prescriptive point of view that  
16 experiments on sentient animals should not be allowed to continue.

17

18

I want to reply to something that has been made in AgResearch's  
19 submission. When they were cross-examined Dr L'Huillier stated  
20 that all experiments on sentient animals go through Animal Ethics  
21 Committees as though this made it an adequate safeguard. I want to  
22 go through some work I've been doing on non-medical animal  
23 experiments in New Zealand over the last four years to highlight  
24 the fact that this is not adequate, that the Animal Ethics  
25 Committee and the Animal Welfare Act and the MAF standard, Code of  
26 Conduct for using animals in science, is not an adequate safeguard  
27 to prevent intrusive unnecessary experiments from going ahead.

28

29

[Video link established but Dr Holland is not present]

30

31

I have made a list of 117 experiments published in New Zealand  
32 between 1996 and October 2000 in refereed scientific journals. I  
33 want to stress that this is the tip of iceberg. Not all  
34 experiments are published either because they're not good enough or  
35 because of commercial secrecy means that experiments are withheld  
36 from publication. So, this is not all the experiments that are  
37 going on, this is the ones I've been able to find.

38

39

I've concentrated on agriculture experiments for three reasons.  
40 Firstly I'm not medically qualified so I don't know all of the ins  
41 and outs of whether a medical experiments might be justified.

42

43

[Video link ended]

44

45

I have my own opinion on this but it's not a professional one.  
46 Secondly most experiments in New Zealand are not in fact medical,  
47 they're agricultural or based on pest control. So, these represent  
48 more of what is actually going on in this country. Sorry, those

1 are the two reasons I chose non-medical experiments. Out of these  
2 117, 58 of them involves severe or very severe suffering on a MAF  
3 scale.

4  
5 I have listed experiments that meet the following criteria, either  
6 there's one, no short-term application at all, so it's done for  
7 intellectual curiosity or because it might be useful at some later  
8 date. Secondly, the application is solely economic, i.e. it is to  
9 increase animal production, it is not to improve human or animal  
10 health.

11  
12 Thirdly, there is some gain involved with animal health, but it is  
13 trivial in comparison with the suffering that's been going on.

14  
15 Fourthly, the experiment was useful, but it could quite easily be  
16 modified at some extra effort and expense so that there is little  
17 or no suffering for the animal. Fifthly, there is unnecessary  
18 duplication, either due to an ignorance of statistics or to an  
19 ignorance of previously published work. Significantly, any that  
20 are meaningless because the experimental technique was poor.

21  
22 Section 80 of the Animal Welfare Act states that experiments can go  
23 ahead if benefits outweigh harms. But then a benefit is MAF Code  
24 of Conduct to include pure research or applications involved in  
25 improving animal production. And I suggest that this is not in  
26 keeping with the public perception of what is ethical at present.

27  
28 I have found out of the 58 that involve severe or very severe  
29 suffering, three published reports on cloning on sheep and cows. I  
30 just want to briefly mention these experiments that were done by  
31 David Wells of AgResearch and co-workers because Dr Wells in the  
32 1999 ANZFA proceedings stated that these are preliminary work  
33 towards genetically modifying cows and sheep, so they're relevant  
34 in the discussion on GM.

35  
36 I think Ms D'Silva, you've already mentioned Wells. One of them  
37 I'll briefly go out, 37 ewes were implanted with cloned embryos,  
38 two of these aborted very late in pregnancy and two of them died in  
39 the uterus. These were late stage embryos, they were very likely  
40 to be sentient and in fact under the Animal Welfare Act I'd define  
41 as animals. All of the late term fetuses had abnormalities, so  
42 presumably were suffering. Three ewes were born by cesarean; and  
43 one of these died 10 minutes later through respiratory failure, so  
44 the results was two healthy lambs out of 37 implants.

45  
46 Another experiment by the same people was cloning the Enderby  
47 Island cow, and in this case there were 22 recipients and two  
48 calves were born. One of these calves had an abnormal rumen and

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1 abomacum and it had to be euthanased two days later, and at least  
2 one of these births was from a cesarean section, and one of the  
3 cows had an infected allantois.

4  
5 Another experiment again by the same people published in 1999, 100  
6 embryos were implanted into 50 recipient cows, and seven of these  
7 were lost in the third trimester, that's the third quarter of the  
8 pregnancy, when they would have been animals according to the  
9 Animal Welfare Act, and 10 calves were eventually delivered by  
10 cesarean section.

11  
12 My conclusion is that the animal welfare - the Animal Ethics  
13 Committee were a good idea in principle, is inadequate in practice  
14 at the moment to protect animals, even now, together with the way  
15 that the Animal Welfare Act is interpreting benefits and harms.

16  
17 I also think that genetically modified procedures will be among the  
18 most intrusive of all non-medical experiments that I'm looked at.  
19 And that, if genetic modification is allowed on sentient animals  
20 then the number of these experiments will increase, and since the  
21 public is not genetically accepting non-medical experiments at the  
22 moment, that it should not be allowed to go ahead on sentient  
23 animals. That's - I've finished.

24  
25 CHAIR: Thank you very much, there will be some questions for you.  
26 Mr Hodson?

27  
28  
29 \*\*\*

30  
31 [10.25pm]

32 MR HODSON QC: I'm sorry to have to address you from behind, Dr Morris.  
33 My question is, whether you have presented the views that you've  
34 just given to the Commission, to the National Animal Ethics  
35 Committee or any other Animal Ethics Committee, or to MAF, and how  
36 they've been received if you've done that?

37  
38 DR MORRIS: I haven't presented them. The reason is, I've only been  
39 doing this research since last May.

40  
41 MR HODSON QC: Thank you.

42  
43 CHAIR: Mr Forman?

44  
45 MR FORMAN: No questions.

46  
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[10.26pm]

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MR UPTON: Thank you, sir. Dr Morris, I am Counsel Assisting the Royal Commission. I'm just looking at your paper, your submission, at paragraph 15.

6

7

DR MORRIS: This is my witness, or is it my paper?

9

10

MR UPTON: This is your witness brief.

11

12

DR MORRIS: Paragraph 15?

13

14

MR UPTON: Yes, paragraph 15 where you're talking about Animal Ethics Committees. Have you got that paragraph?

15

16

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DR MORRIS: I've got that now, yes.

18

19

MR UPTON: Thank you. You're talking there about a time before the new Animal Welfare Act came into force.

20

21

22

DR MORRIS: Yes.

23

24

MR UPTON: Are you aware of how the committees are working at the moment, since the Act has come into force?

25

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DR MORRIS: Yes, I am.

28

29

MR UPTON: And what's your understanding of the present situation?

30

31

DR MORRIS: The present situation is that one of the concerns of ours has been addressed in that there is now an independent audit.

32

33

34

MR UPTON: Right.

35

36

DR MORRIS: But the other concerns are still a problem.

37

38

MR UPTON: Who is it that makes the independent audit?

39

40

DR MORRIS: As far as I understand it's somebody appointed by MAF.

41

42

MR UPTON: You say in your paragraph that New Zealand scientists and researchers are ethically naive and complacent and bitterly resent Government interference in their activities. What's the basis for saying that?

43

44

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47

DR MORRIS: The basis is, these ANZCCART proceedings, and I've discuss this more fully in my paper which is the appendix.

48

1

2

MR UPTON: I follow. Thank you. But, that's not your own personal inquiry of the scientists and researchers, that's based on what's in the proceedings that you've just referred to?

5

6

DR MORRIS: Yes.

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MR UPTON: Thank you. Yes, I think I'll leave it at that, thank you, sir. That completes my questions.

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[10.28am]

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DR FLEMING: Yes, I'd like you to make a comment on Professor Holland's statement that, with a genetically modified animal producing the example used was insulin, but any protein in its milk, if it was - still contained its naturalness, which natural state of being, if you like, as an animal, would you like to comment on whether you see that animal as suffering in any way or --

22

23

24

25

26

DR MORRIS: I would consider that a big "if" just because genetically modifying the animal involves the same procedures as the cloning experiments which I've just described. But yes if it could still maintain its integrity I would see no problem.

27

28

29

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31

DR FLEMING: If that animal could be bred to produce more animals all containing the same modification so they produced the same protein in their milk but that they didn't have to be cloned or they didn't have to undergo the original genetic manipulation, what about that?

32

33

DR MORRIS: Then I would see no problem.

34

35

DR FLEMING: Thank you.

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CHAIR: Dr Morris, the Commission I think has some knowledge of the Animal Ethics Committees or at least individual members do, but we don't have very much on record about them. You speak of them in paragraph 15 in the plural.

41

42

DR MORRIS: Yes.

43

44

CHAIR: Is this a regional system, or how does it work?

45

46

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DR MORRIS: As far as I understand it, either a campus of a Crown Research Institute or a university, sometimes a university department, has their own Animal Ethics Committee.

1 CHAIR: And do you now how they're appointed?

2

3 DR MORRIS: Yes, I know something of it, that a vet from the New Zealand  
4 Veterinary Association, there are scientists from within the  
5 organisation, there is an animal welfare representative, at the  
6 moment only from the NZSPCA, and there is a member of the regional  
7 or local council.

8

9 CHAIR: And who makes the appointments, the local university or how does  
10 it work?

11

12 DR MORRIS: The appointments are - do you want to say something?

13

14 MR REESE: Yeah, the institution makes the appointments, it's all  
15 internal.

16

17 CHAIR: Do you - I don't mind if Mr Reese answers the question, but does  
18 your organisation have a concern first of all about the spread of  
19 membership.

20

21 MR REESE: Spread of membership of?

22

23 CHAIR: Of the Animal Ethics Committees.

24

25 MR REESE: I think we have made the point in our submission, and I think  
26 it's an important point because it may be as AgResearch have  
27 suggested, put up as a current approval system for genetic  
28 experiments of the - the point we really wanted to make, and I  
29 think it does need to be stressed that in no way do we believe that  
30 these institutional committees are equipped to deal with this these  
31 sort of issues, ethical being issues put forward by genetic  
32 experiments which is why both Dr Morris and SAFE have highlighted  
33 some of the failings of these committees. So, we're concerned that  
34 there may - yeah, to make sure that it's clear from our submission  
35 that they're not equipped to deal with genetic engineering  
36 experiments.

37

38 The independent survey that's been done, I believe that there's no  
39 - nothing has actually been completed yet, or that isn't something  
40 that's been completely put in place. I spoke to David Burrell the  
41 director animal welfare of MAF just recently and I think one  
42 institution's offered to organise their own audit voluntarily, but  
43 no results have come through from that and we're concerned this  
44 isn't in the system there has been no real redress, from many of  
45 the concerns put forward by Dr Morris and the others about the  
46 ADC's, the ethics committees.

47

48 CHAIR: Yes, thank you.

1

2

MR HODSON QC: I don't want to cut across the evidence, but it may be well to research how the ethics committees are constructed. My instructions are that the university would appoint the scientist, but each of the other points are responsible by the organisation, for example the Vets Association for the vet.

7

8

CHAIR: Comment on that Mr Reese?

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MR REESE: Yes, it's true, it's not a very clear system. There's actually a number of situations that the other representatives can be appointed. And, it is - yeah, certainly not always - I mean I think there's a number of people can be involved as these things do happen. In some cases the RSPCA are contacted, in some cases the Ministry of Agriculture and Fisheries might recommend someone. There is a number of - but the majority of the AEC is the scientists and that's certainly the case, so a majority of the appointments are made by the institution.

20

21

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23

DR FLEMING: Am I right in thinking that a lay person, the lay person on the committee, is advertised for publicly in the newspapers as well?

24

25

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28

MR REESE: I'm not sure.

DR FLEMING: You're not sure. That is my belief; that that is what happens, but I'm not 100% sure.

29

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31

MR HODSON QC: I think that might be right and it's the local District Council who handles that part of the process.

32

33

DR FLEMING: Thank you.

34

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CHAIR: Anyway, Mr Reese, you've made it clear that your concern is with the system as a whole. Do you want to comment about the membership accepting the system as such? Should there be a wider membership or a different membership.

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MR REESE: We don't believe that institutional ethics committees could ever probably be sufficient to consider the ethical dilemmas of a genetic engineering experiment, and I think this is something that Alan Holland may have been inferring as well. Is that, it could certainly only be handled by a National Ethics Committee, certainly be a much more preferable - there is always such a number of problems. The animal welfare appointments representatives to these committees invariably really struggle to comprehend some of the experiments that are going on, the implications, the welfare and the ethical implications, as well as the other lay people. And,

1 because in most cases the majority of scientists from the  
2 university are involved in this sort of research, and the Chair is  
3 appointed by the university; I understand, that it's very difficult  
4 to make - for the lay people, of the welfare representative to make  
5 any real contribution, and they are often sort of carried along  
6 with the majority opinion.

7

8 DR ALLAN: Mr Reese, are those committee meetings actually recorded and  
9 that transcript available to people to peruse later?

10

11 DR MORRIS: Can I make a comment on that because I actually requested  
12 minutes of meetings under the Official Information Act.

13 Massey University divide their meetings up into two parts; one is  
14 available for the public and one is closed, and they didn't give me  
15 any closed meetings. AgResearch proved totally intransigent and  
16 wouldn't let me have any minutes of meetings, or the names, or the  
17 affiliations of the Animal Ethics Committee members.

18

19 MR REESE: They definitely generally are not published or made  
20 available. In fact, the committee members are advised that  
21 material is confidential, and their discussions are confidential.

22

23 DR ALLAN: Can you actually go to meetings? Because, I'm aware with  
24 Medical Ethics Committees that they're actually opened to the  
25 public.

26

27 MR REESE: I don't believe they are; there may be some situations where  
28 they have an open meeting, but generally when discussions of the  
29 experiments is underway there's no access at all by anyone else.

30

31 CHAIR: Am I right in thinking there is actually a National Committee at  
32 the moment?

33

34 MR REESE: There is a National Ethics Advisory Committee, called NAEAC,  
35 but at this stage they're really only an Advisory Committee.

36

37 CHAIR: Some of the decisions are made at local level?

38

39 MR REESE: Yeah, they are really and they set up their own code of  
40 conducts which is as well at the institution level. There is a  
41 framework which is set in place which is obviously with the  
42 National Committee would have input into. But at the moment it's,  
43 as Dr Morris has pointed out, even the framework, we don't believe  
44 is working sufficiently.

45

46 CHAIR: NAWAC was one of the bodies you mentioned, but that you were  
47 surprised they hadn't mentioned to us?

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1 MR REESE: That's right.

2

3 CHAIR: So, is the thrust of your submission, and I apologise if I've  
4 overlooked something in your long submission that is already there,  
5 but is the thrust of your submission on this point that decisions  
6 should be made at a national level?

7

8 MR REESE: I think the main point is that the AEC's do not work, and  
9 certainly could not work and in much more high pressure and more  
10 difficult environment of approving genetic engineering experiments.

11

12 CHAIR: I'm trying to tease out whether the point is that the local  
13 committees don't work and that system should be improved or whether  
14 you're advocating a different system altogether?

15

16 MR REESE: Yeah, definitely a different system. I would refer back to  
17 the recommendations, substantial recommendations of our submission,  
18 that if genetic engineering of animals is allowed to continue in  
19 some form, then there would definitely need to be a different  
20 system of ethical approval and monitoring, and we're suggesting  
21 that a national system based on the Dutch model, and within a  
22 legislative framework, which we've also suggested of an outright  
23 ban on many experiments as well and contained within the National  
24 Committee.

25

26 CHAIR: Thank you very much, Mr Reese, Dr Morris, and all of you for  
27 your presentation and for adding to the sum of our knowledge in  
28 this difficult area.

29

30 We'll take the morning break, and I don't know whether Greenpeace  
31 representatives on GE are here, but if they are, we'll aim to start  
32 we'll adjourn until 11 o'clock.

33

34

35 Adjournment taken from 10.40am to 11.02am

36

37

38 CHAIR: Yes, good morning, we're looking forward to hearing from you, and  
39 I understand Ms Cotter, you're going to present first; is that  
40 right?

41

42 MR CURRIE: Good morning, Sir Thomas.

43

44 CHAIR: Sorry Mr Currie, I didn't spot you there.

45

46 MR CURRIE: No problems, just to mention that Mr Trussell here is also  
47 presenting jointly with Professor Traavik, Friends of the Earth.

48

1 MR TRUSSELL: Yes I'm Denis Trussell appearing on behalf of Friends of  
2 the Earth and for ECO, the Environmental Conservation Organisation.  
3 The witness we'll share today with Greenpeace is Dr Traavik. We're  
4 pleased to present Dr Traavik. We believe his particular area of  
5 expertise, the behaviour and ecology of genetic material, be of  
6 great importance in this debate, and that his depiction for  
7 complexity and unpredictability of the genetic flux underlines the  
8 need to apply the Precautionary Principle to genetic modification.  
9

10 CHAIR: Yes, thank you Mr Trussell.  
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1 PRESENTATION BY GREENPEACE NEW ZEALAND INC.

2

3

4 MS COTTER: Sir Thomas, members of the Commission, good morning. My name  
5 is Annette Cotter and I'm a Greenpeace campaigner on GE. Thank you  
6 for the opportunity for allowing us the present to you today and  
7 for travelling here also. I would like to introduce the witnesses  
8 who are with us in the order that they will appear.

9

10 I would like to outline our presentation and introduce the  
11 witnesses who are with us in the order that they will appear and  
12 explain about our teleconference and our video link. On my right  
13 is Dr Doreen Stabinsky from Maine in the United States who is a  
14 scientific advisor for Greenpeace. She is the first to speak and  
15 will outline in scientific terms the environmental risks of genetic  
16 engineering and how the regulatory systems cannot adequately  
17 address these risks. Dr Stabinsky will specifically address field  
18 trials in this context.

19

20 On the far end is Bill Christison who is President of the National  
21 Family Farm Coalition and a soybean farmer. He's from the midwest  
22 in the United States and is speaking on the impact of GE on the  
23 farming communities in the United States and other countries.

24

25 Beside him is Terje Traavik, a Professor of Virology at the Medical  
26 School of the University of Tromso and Scientific Director of the  
27 Institute of Gene Ecology in Norway. Professor Traavik is  
28 appearing, as has been said, on behalf of Greenpeace, Friends of  
29 the Earth and ECO. His expertise is on horizontal gene transfer  
30 and the inherent unpredictability of genetically engineered  
31 organisms. Professor Traavik is members of the Norwegian  
32 Royal Commission on genetically modified foods, the outcome of  
33 which is currently before the Norwegian Government.

34

35 Anuradha Mittal, who's the co-director of Food First, Institute of  
36 Food and Development policy was unfortunately unable to appear  
37 before the Commission in person today. She was turned back at the  
38 Bangkok airport and inquiries as to what happened are still  
39 continuing. So - and she is very very disappointed to not be here  
40 today. She is due to appear on teleconference at 3.30pm from New  
41 Delhi. Her brief is regarding the socioeconomic impacts of genetic  
42 engineering in developing countries.

43

44 Jonathan King, who's the professor of biology at the Massachusetts  
45 Institute of Technology and a member of the Biophysicists Society  
46 will appear on video link at 4pm. A practising molecular  
47 biologist, he will be putting forward arguments opposing the  
48 patenting of life forms. If it pleases the Commission, we request

1 that questions pertaining to patents follow his presentation.

2

3 I would also like to introduce Stephanie Howard and Jim Thomas, who  
4 are two other members of Greenpeace, they are on the panel to  
5 answer questions.

6

7 Greenpeace New Zealand is the New Zealand national office of  
8 Greenpeace International which is an international environmental  
9 organisation with a presence staff and volunteers in more than 40  
10 countries. Greenpeace works to defend nature and to promote  
11 practical solutions to environmental problems. Currently  
12 Greenpeace international has over 2.5 million supporters worldwide.

13

14 Greenpeace is calling for a ban on the release of genetically  
15 engineered organisms into the environment and has been campaigning  
16 on this issue for over 10 years. Because of the grave  
17 environmental threats they pose, and the fact that they can never  
18 be recalled, we believe that genetically engineered organisms have  
19 no place in the environment. It is not just an issue that stops at  
20 the farm gate, the field trial or the site of production, the  
21 release of genetically engineered organism in any one place in our  
22 country has implications for all New Zealand, for the rest of the  
23 world and for future generations.

24

25 The Commission has already heard of many indicators that showed  
26 public unease about genetic engineering which includes scientific  
27 and cultural concerns, ethical and economic considerations and  
28 plain commonsense. Greenpeace welcomes the fact that the  
29 Commission is approaching this issue on many different levels, for  
30 societal aspirations and values are fundamental to the way we live  
31 as a community.

32

33 Aside from current societal concerns, we need to address the  
34 long-term implications of genetic engineering. The crossing of  
35 species boundaries and the release of genetic pollution is an  
36 intervention into natural processes on an evolutionary scale at  
37 unprecedented speed. In effect, those who are seeking to release  
38 genetically engineered organisms are making decisions in just a few  
39 years, but whose consequences may span thousands of years.

40

41 Suisse Reid, one of the largest insurance companies, make an  
42 assessment of their business and say, "some risks defy our powers  
43 of imagination. As is often the case with powerful technologies,  
44 the implications of releasing genetically engineered organisms may  
45 not be realised for many generations, yet they are being rushed  
46 through for commercial reasons".

47

48 As Dr Christine Von Reisacker, a German biologist has said,

1 "genetic engineering is an experiment on the scale of the history  
2 of evolution". I was struck by this when I read about the  
3 experiments conducted with a genetically engineered bacteria  
4 klebsiella planticola. This organism has been approved by the US  
5 regulatory bodies for field trials. It was only when an  
6 independent scientist voluntarily conducted experiments of her own  
7 that the potential consequences were realised. The release of this  
8 organism could have had devastating effects on the terrestrial  
9 plant life. I understand Dr Ingham has appeared before the  
10 Commission to present her work.

11  
12 As numerous witnesses have submitted, we know so very little of the  
13 ecosystems of which we are a part and the human impact on the earth  
14 over the last 100 years has been so damaging that adopting the  
15 Precautionary Principle with respect to not only GE but all ways in  
16 which we interact with other species is a responsible and  
17 appropriate course of action.

18  
19 The patenting of life is a distortion of the relationship we have  
20 with our environment. What has previously been our shared heritage  
21 is now being turned into a commodity to be owned by individuals and  
22 companies. Greenpeace submits that this is contrary to the basic  
23 respect that the environment in which we live deserves. There are  
24 also other unacceptable consequences of patenting systems as our  
25 witnesses will testify. As a result, Greenpeace is calling for no  
26 patents on life.

27  
28 Environmental awareness is growing all the time, the agricultural  
29 practices we choose need to reflect this growing awareness.  
30 Concerns about genetic engineering have also formed part of the  
31 wider debate about the way in which we grow food. Greenpeace  
32 support the vision of Organics 2020 and believes that organic food  
33 has clear benefits for our environment and our farmers.

34  
35 Our submission also outlines the ways in which markets around the  
36 world are rejecting genetically engineered food. This includes  
37 many companies in New Zealand who also recognise the market demand  
38 for GE free and organic produce.

39  
40 As our witnesses will testify to the Commission today that our  
41 understanding of ecosystems and the genetics of living organisms is  
42 far too rudimentary, and the potential consequences of molecular  
43 meddling far too great for us who to allow the introduction of  
44 genetically engineered organisms into our environment.

45  
46 We have some - we have tabled some documents which we expect to  
47 draw on during our presentation.

1 Now, I'd like to call on Dr Doreen Stabinsky as our first witness  
2 as the scientific advisor for Greenpeace.

3

4

5 \*\*\*

6

7 [11.13am]

8 DR STABINSKY: Thank you Sir Thomas, members of the Commission. I'm  
9 very pleased to be here today. As Annette said, I'm here from  
10 Maine as a scientific advisor for Greenpeace, and I'm actually  
11 quite excited about the undertaking of the Commission that you have  
12 been participating in over the last several months. You know, many  
13 people around the world have serious concerns about genetic  
14 engineering and consequently many eyes are here on New Zealand, and  
15 I think many people around the world are very thankful of the  
16 considered deliberations that you are undertaking here, and I'm  
17 very happy to be able to contribute to that.

18

19 Today I'm going to be putting forward a predominantly scientific  
20 rationale for the Greenpeace position against the introduction into  
21 the environment of genetically engineered organisms. And I say,  
22 predominantly scientific because it's the Greenpeace position that  
23 this is not merely a scientific question. Our objection to the  
24 introduction of genetically engineered organisms into the  
25 environment has ethical, social, economic, political, cultural  
26 components, but my task here today is to illustrate primarily the  
27 scientific concerns.

28

29 Our position is that genetically engineered organisms pose the  
30 potential for serious long-term irreversible harm to the  
31 environment of New Zealand, and indeed to the entire world and  
32 we're opposed to the introduction into the environment of  
33 genetically engineered organisms beginning with field trials and  
34 extending, of course, to commercial scale release and release into  
35 the food supply.

36

37 So my presentation today is going to focus on two main topics. I  
38 would like to make a general commentary on the limitations of risk  
39 assessment, ecological risk assessment as applied to genetically  
40 engineered organisms and rationale or the application of the  
41 Precautionary Principle. And also I'm going to talk about our  
42 specific concerns regarding the field testing of engineered  
43 organisms here in New Zealand.

44

45 Now - turning to this question of risk assessment, it's our  
46 position that risk assessment and risk management is an inadequate  
47 regulatory paradigm for the regulation of genetically engineered  
48 organisms. And I'm going to - I'm going to stand up and work with

1 some overheads.

2

3 The risk assessment that's been used for risk assessment  
4 methodologies used for genetic engineering have been modelled on  
5 those used for chemicals and the introduction of chemicals into the  
6 environment. Now in traditional risk assessment for environmental  
7 and human health toxicity are particular chemicals. Risk is  
8 simplification, but it is sometimes exposure. So in order to  
9 assess the environmental risks of a chemical, first you identify  
10 the hazard, by identifying what are called end points. That is  
11 looking to see if there are particular hazards such as  
12 carcinogenicity, teratogenicity, birth effects causing associated  
13 with particular chemicals.

14

15 Then risk assessors to do an exposure risk assessment, that is, if  
16 an organism was out in the environment, how much of that particular  
17 chemical might it be exposed to? And then they go back into the  
18 laboratory and do what's called a dose response assessment with  
19 laboratory animals; rats is a typical example. If the rat is  
20 exposed to a particular level of chemical, would you or would you  
21 not see this particular effect, this end point?

22

23 Now, there are some practical limitations to risk assessments that  
24 I want to talk about next.

25

26 [Overhead used]

27

28 The first limitation, these end points that we can measure are  
29 limited to major quantifiable effects. Such as lethality, acute  
30 toxicity the organism drops dead, or cancer and to effects that can  
31 be detected within the experimental timeframe of the assessment.

32

33 Now that means that sublethal impacts, and there are many of them,  
34 that may be of significant ecological consequence aren't end points  
35 that are tested for or that you are able to test for. Such things,  
36 if we're talking about chemical toxicity, is altered behaviour of  
37 the organisms, reduced learning ability, immune system impacts.  
38 These would develop over a much longer time than you could actually  
39 measure in the context of risk assessment.

40

41 So my second point, the measurable timeframe of a risk assessment  
42 is necessarily short-term, but the impacts may show up over much  
43 longer time scales. And if we think about this in the context of,  
44 say, weeds. Scientists have looked at the introduction of a plant  
45 into an environment, looked at historical records to measure how  
46 long it might take for weeds to develop. For that introduced plant  
47 to actually develop into a weed and those historical records show  
48 that time scales in the order of 30 to 150 years are necessary for

1 many plants turning into.

2

3 My third point, test organisms are limited to those that are easily  
4 curable or measurable; laboratory rats because we can grow them  
5 very easily in the laboratory, they are pretty good at mimicking  
6 many aspects of mammals, you know, of human systems. But in  
7 fact for ecological purposes the organisms that we can bring into  
8 the laboratory are not necessarily those that are ecologically  
9 significant.

10

11 For instance, in an endangered species - you wouldn't want to bring  
12 an endangered species into a laboratory for toxicity tests; in  
13 fact, it's illegal to do such a thing. And yet, the ecological  
14 significance and the impacts on this, that endangered species are  
15 something that we want to know about.

16

17 My final point; that it's impossible to extrapolate from tests on  
18 single organisms to predict effects on entire ecosystems. Impacts  
19 on single organisms don't necessarily detail the impacts that you  
20 would see on a large ecosystem, which is an interaction of  
21 individuals. You can, in the laboratory, test impacts on a suite  
22 of organisms, but the interaction of those organisms within their  
23 environment is not testable.

24

25 There are some larger epistemological problems with this concept of  
26 risk assessment. And I stated - I've started to state this, that  
27 the complexity of ecosystems can't be taken into account.  
28 Ecosystems as a higher level of organisation has - there are  
29 emergent properties as you get up to higher and higher levels of  
30 organisation. If you think about foodwebs, organisms interact with  
31 each other in feeding relationships or something that we call  
32 foodwebs. And those interactions, once altered, it's very  
33 difficult for us, or even possible for us to predict what the  
34 longer term consequences of an alteration in feeding relationships  
35 are. There are feedback loops in ecosystems, webs of  
36 interdependency, multiple causalities.

37

38 What you can measure is not necessarily what is relevant. In fact,  
39 in terms of ecological risk assessment, what we care about are  
40 impacts that show up at the population level or the ecosystem  
41 level. What we're able to measure are impacts actually at the  
42 sub-organismal or the organismal level. Impacts on single  
43 organisms.

44

45 Lacks adequate statistical power. This is actually a very  
46 important point, and I'll illustrate it with an example. There's  
47 been scientific studies looking at the impacts of feeding BT crops  
48 to a pest and then feeding that pest to something that eats that

1 pest, a green lacewing. And, it's been shown that there's been a  
2 reduction - an increase in mortality and a reduction in fecundity  
3 or an ability to produce offspring of the green lacewing when  
4 they're fed this BT fed prey. And, orders - the reduction in  
5 population, because of that diet, has been somewhere around 30%,  
6 they've seen 30% mortality in the green lacewings.

7  
8 Now, you can detect 30% mortality in the laboratory and I think we  
9 would probably all agree that 30% reduction in a population is a  
10 significant reduction in a population. However, because of the  
11 limits of statistical analysis and the need for multiple replicates  
12 of an experiment in order to detect such a 30% reduction in  
13 mortality, it's impossible to design a manageable field experiment  
14 where you could actually see that 30% reduction in the field. And  
15 they, and the ecologists that I've talked to about this, say in  
16 fact manageable field level experiments would be able to detect  
17 200% or 300% differences, right, but that difference is of 30% are  
18 not detectable in the field.

19  
20 So that, those effects, these sublethal effects, these effects with  
21 potential long-term consequences, are not - you're just not able to  
22 detect them in field scale experimentation.

23  
24 Finally a general problem of ecological risk assessment. You  
25 assume that you can quantify risks. But in fact with genetic  
26 engineering we're talking about a couple of parameters that are  
27 just not quantifiable. One, how do you quantify the probability of  
28 an unpredictable event? It's very very difficult. And, the second  
29 thing that I think is even more difficult, how do you predict the  
30 magnitude of harm of something that - of such an unpredictable  
31 event? I mean if you can't characterise the event to begin with to  
32 any great degree, how can you then assess the magnitude of harm?

33  
34 Now, there are some implications of these limitations of risk  
35 assessment for the regulation of genetically engineered organisms.  
36 And I stated some of these in other ways. Risk assessment can't  
37 provide us with the answers to questions of long-term ecological  
38 impacts. It's not powerful enough to predict long-term ecosystem  
39 level effects in any type of reliable quantitative manner which is  
40 required by the risk assessment paradigm.

41  
42 Risk assessment cannot be used to predict the probability of an  
43 unpredictable event occurring, nor state the degree of hazard from  
44 such an event. And I would go further than my third point, that  
45 irreversibility, this potential - the irreversible potential of  
46 these problematic events that, there are significant ethical  
47 implications coupled to that.

48

1 Now, because risk assessment is inadequate for determining whether  
2 or not to release genetically engineered organisms into the  
3 environment, I would say that this is a clear situation for the  
4 application of the Precautionary Principle.

5

6 Let me just talk a little bit about the Precautionary Principle, a  
7 short phrase that encapsulates our perspective on the Precautionary  
8 Principle is that, under threats of serious or irreversible damage,  
9 which is what we're talking about here with genetically engineered  
10 organisms, irreversible, irreversibility, it's imperative that  
11 there is a moral imperative to make precautionary action to prevent  
12 that damage. And, because of that Greenpeace is calling for a ban  
13 on the release into the environment of genetically engineered  
14 organisms.

15

16 And in fact, the countries of the world as they were negotiating  
17 the Cartagena protocol on biosafety, I think understood very well  
18 the limitations of risk assessment whether they wrote Article 10  
19 which is the decision procedure. And in fact there's similar  
20 language in Article 11 which is the procedure that deals with  
21 importation of LMOs, living modified organisms for food, feed and  
22 processing.

23

24 But note what the countries of the world said; they said that first  
25 in Article 10.1, decisions taken by the party of import have been  
26 in accordance with Article 15, we will do a risk assessment and we  
27 will take a decision based on that risk assessment. But then they  
28 understood right that in many instances risk assessment will not  
29 provide the data, the information necessary in order to do that,  
30 and they added Article 10.6. And let me just point out what I  
31 think are the important points of Article 10.6.

32

33 Lack of scientific certainty due to insufficient relevant  
34 scientific information and knowledge regarding the extent of the  
35 potential adverse effects and then I'll jump down, shall not  
36 prevent that party from taking a decision as appropriate, final  
37 line, in order to avoid or minimise such potential adverse effects.  
38 And I think it's important that the Cartagena protocol allows  
39 action to avoid potential adverse effects in their decision  
40 procedure.

41

42 There is other international precedent for taking such a move, for  
43 asking for a ban on hazardous substances and release of hazardous  
44 substances in the environment. One of those examples is in the  
45 draft Stockholm Convention on persistent organic pollution which  
46 countries of the world will finalise this coming May in Stockholm.  
47 Where the countries of the world have banned the release of a  
48 certain set of persistent organic pollutants because of the

1 potential, the hazards of those pollutants in particular because  
2 they persist in the environment and because they bioaccumulate,  
3 that is they accumulate in cells of living organisms and can  
4 actually concentrate as you move up the food chain.

5

6 There is also another international precedent, and this is with the  
7 OSPAR Commission, the Oslo and Paris Commissions that regulate the  
8 North Sea, dumping of waste and materials into the North Sea. And  
9 the OSPAR Commissions have gone further than just the small number  
10 of persistent organic pollutants dealt with at the Stockholm  
11 Convention; they said all organochlorines should be phased out  
12 within the next 20 years. That's 40,000 chemicals. There is not  
13 data on every single one of those chemicals. There's no exact  
14 scientific analysis of each of those chemicals. What they do know  
15 is those chemicals fit in a particular class, has particular  
16 characteristic, they're persistent, they bio-accumulate, they have  
17 the potential for toxicity. We know there are problems with many  
18 of those organic chlorines in terms of their toxic impacts.

19

20 Greenpeace would argue that in fact genetically engineered  
21 organisms have similar characteristics. They not only can persist  
22 in the environment, they have their own type, I would call  
23 "bio-accumulation" because genetically engineered organisms  
24 actually replicate. They not only persist in the environment but  
25 they can actually increase in quantity in the environment; with  
26 unpredictable and irreversible long-term impacts.

27

28 And because of that, it's our position that they should be treated  
29 like any other hazardous - like these other hazardous substances  
30 and, therefore, banned.

31

32 I want to make a short digression before I continue on with field  
33 trials to say that in fact one important characteristic of the  
34 Precautionary Principle, and I have some papers on the  
35 Precautionary Principle that I'd like to table today, that an  
36 important characteristic of the Precautionary Principle are the  
37 implementation of the Precautionary Principle, is that where  
38 there's demonstrated emasculating are less toxic, that those are  
39 the emasculating that should be looked at, and in fact we have a  
40 number of emasculating to the release of genetically engineered  
41 organisms into the environment in organic and sustainable  
42 agricultural systems.

43

44 And in fact, this is a really key area for scientific expertise to  
45 be developed and - not sure what the word is, well to be developed  
46 in New Zealand. Ecological expertise that can then feed into  
47 developing organic and sustainable emasculating to the use of  
48 pesticides and other noxious agents in agricultural production as

1 well as ecological expertise that helps assist with plant breeding  
2 and that can help understand the problems of biological invasion.  
3 Certainly, in particular for an island nation like New Zealand.

4  
5 I think another area of scientific expertise that's called for with  
6 respect to looking for emasculating and developing emasculating is  
7 the area of molecular biology. That in fact, there are a huge  
8 range of uses of molecular biology that could be utilised for  
9 organic agriculture and in just general understanding of the world  
10 around us. So, tools like marker assisted selection, the use of  
11 genetic engineering to help in breeding processes that does not  
12 result in a genetically engineered organism being put into the  
13 environment.

14  
15 Molecular tools to help us understand more deeply the soil  
16 processes, important processes that are going on in the soil, other  
17 ecological processes etc.

18  
19 Let me come back to my final point about our opposition to field  
20 testing, and I want to make four quick comments.

21  
22 Greenpeace is opposed to the field releases of genetically  
23 engineered organisms into the environment. Field trials are not  
24 contained. Even if you are emasculating flowers, even if you're  
25 preventing them from setting seed, there is the potential for the  
26 genetic information to get into the environment through horizontal  
27 gene. Therefore there is the potential for non-target impacts,  
28 there is the potential for root exudates to release into the soil  
29 of the recombinant protein.

30  
31 Field trials, as I've said earlier, can't provide adequate data to  
32 use in a risk assessment for commercial release, and the corollary  
33 for this is, if the society is not interested in the commercial  
34 release, then there's no need to take ecological risks. That will  
35 be opposed by field trials, particularly in New Zealand, where you  
36 have special ecosystems and a number of threatened plants and  
37 animals.

38  
39 I conclude by saying that some things, on the basis of their  
40 intrinsic properties, simply shouldn't be released into the  
41 environment, whether or not you have evidence that they'll cause  
42 harm. It is simply unacceptable for someone to come up with a  
43 proposal to release an intrinsically hazardous substance in the  
44 environment in order to determine whether or not its potential for  
45 adverse effects are actually realised.

46  
47 We believe it's not a matter of time in order to get the science  
48 right, but a matter of principle of responsible Governance that

1 genetically engineered organisms should not be released into the  
2 environment on any scale, given the inherent unpredictable and  
3 irreversible potential for harm that they possess. Thank you very  
4 much.

5

6

7 \*\*\*

8

9 [11.33am]

10 DR CHRISTISON: Good morning to Sir Thomas and the members of the  
11 Royal Commission here. I do have a limited number of documents  
12 that I would like to table for you to review.

13

14 I want to thank this Commission for receiving the testimony I'm  
15 about to present. Because of the good judgment of the Government  
16 of New Zealand in appointing a Commission of this magnitude of  
17 members of broad-based experience and expertise, New Zealand is  
18 appropriately approaching the question of whether or not genetic  
19 engineering will play a role in your people's and, therefore, your  
20 country's future. To be sure, the eyes and the ears of the world  
21 who are both for and against genetic engineering await the  
22 recommendation of this Commission.

23

24 I have come to your fair and beautiful country to speak about  
25 genetic engineering and my experience as a family farmer. I have  
26 been invited to speak by Greenpeace and on behalf of our 36  
27 organisations located in 35 of the United States.

28

29 I also am here to speak for our 80 organisations of the Genetic  
30 Engineering Action Network USA and Farm Aid, which is Chaired by  
31 Willy Nelson, who does a great job of putting agriculture issues on  
32 the front burner across the country.

33

34 I also speak for the many members of Via Campesina around the  
35 world, and if you aren't acquainted with Via Campesina, it is an  
36 international organisation of farmers, real people and peasants.

37

38 I'm a fourth generation family farmer and part of my land was  
39 purchased by my grandfather in 1869. Today that land is as  
40 productive as it has ever been. My most recent crop of soybeans on  
41 this land yielded 62 bushels per acre. This yield is nearly twice  
42 our county average yield. This land has never been sprayed with  
43 Roundup, nor has any GMO seeds been planted on it. In close  
44 proximity sound Roundup Ready soybeans that look likely to yield 50  
45 bushels or more per acre actually yielded from 17 to 35 bushels due  
46 to yield drag of GMOs and the susceptibility of a disease called  
47 Sudden Death Syndrome. This disease was very widespread this past  
48 year in the Midwest. There is new evidence that glyphosate, the

1 weed killer Roundup, increases fusarium, a soil fungus which  
2 facilitates Sudden Death Syndrome. These are unintended  
3 consequences of genetic engineering in corn and soybeans.

4  
5 Agriculture is a most important vocation, and farmers are the most  
6 indispensable people on earth. Fortunately, the world still has  
7 about 1.4 billion farmers but, sad to say, in the US we lost  
8 farmers at the rate of 500 farmers per week. In the US our  
9 population is over 280 million people with 1.9 million farmers,  
10 with just 333,000 of those farmers producing 83% of the food and  
11 fibre.

12  
13 Last year, nearly 50% of US farmers' income came from Government  
14 and taxpayers in the form of subsidies. The lion's share of GMOs  
15 are produced in the United States, and I am here to inform you that  
16 GMOs have brought a multitude of problems to our country. There is  
17 little doubt genetic engineering is one of the largest issues being  
18 discussed around the world today, and genetic engineering raises  
19 serious ethical and moral questions. Never before in the history  
20 of the world has man had the ability of creation; creation. I  
21 believe this ability of creation runs counter to the main theme of  
22 great religions of the world. Remember, genetic engineering is not  
23 a hybridisation or an evolutionary process, the results are indeed  
24 a new creation.

25  
26 In the rush to contaminate the seed supply and flood the world with  
27 GMOs, multinational corporations fail to do the necessary long-term  
28 testing to prove the safety of their products and now the people of  
29 the world are the guinea pigs and must suffer the present  
30 consequences and the yet unknown long-term results.

31  
32 The diversity of the people of the world, their heritage and  
33 cultures are worth preserving. The people should not be duped into  
34 accepting a life of uniformity and standardisation, the one size  
35 fits all concept of multinational corporations. Genetic  
36 engineering corporations have tried to corner the market, not only  
37 on technology but also on seeds and chemicals. I believe  
38 Monsanto's driving force was the inevitable termination of their  
39 patent on the chemical Roundup.

40  
41 The Monsanto's of the world have little social conscience. My  
42 neighbour died from what the doctor said was chemical poisoning  
43 from Monsanto's chemical Lasso. The use of Lasso is now illegal in  
44 the US. But we can all remember agent orange, DDT and 245T, which  
45 were also supposed to be safe.

46  
47 Genetic engineering is a technology looking for a necessity. The  
48 truth is, GMOs cost more and they yield less. In addition, nearly

1 all benefits accrue to the account of a handful of genetic  
2 engineering corporations.

3  
4 The ecological problems of GMOs in the United States are compounded  
5 by the large percentage of acres that are planted with GMO seeds  
6 and results in a huge amount of contamination of our production and  
7 seed supply. One 40 acre field can contaminate 140 acres of  
8 surrounding crops by GE companies' guidelines. The real truth is  
9 dependent on the crop, the wind velocity, humidity levels, also  
10 insect and animal activity that contamination could cover a much  
11 larger area.

12  
13 Many farmers that are producing BT corn do not observe the rules to  
14 develop refuges of conventional hybrids to prevent the chemical  
15 from, you know, through the breeding process that the chemicals  
16 will no longer be effective. The farmer's infrastructure, or the  
17 elevator operator facilities, are not remotely capable of  
18 separating GMOs and conventional production.

19  
20 From my farm our production is into terminal markets, and I haul  
21 900 or 1,000 bushels of soybeans on a truck haul. Whenever I get  
22 to the unloading dump it takes about 4 minutes, sometimes just 3  
23 minutes, to unload that whole load of soybeans, and there is  
24 another truck behind ready to unload. So, you can see the problem  
25 associated with separating and keeping the seeds in different bins.

26  
27 Seed companies will not guarantee no contamination of conventional  
28 seeds any longer. In our area farmers complain that different  
29 weeds are showing resistance to a chemical called Roundup and there  
30 are problems of gene flow into plants that become weeds which are  
31 difficult to deal with. Volunteer Roundup corn in Roundup Ready  
32 soybeans is also a problem.

33  
34 GE corporations with well-funded promotion of their products  
35 through slick advertisements promise higher yields, cleaner fields  
36 and more profit. I have observed this has not been the results of  
37 my neighbour's crops. I would site the Benbrook studies which I  
38 think you have already seen, which shows 8200 college of university  
39 test yields - that soybeans yield on the average, the GMO being  
40 yielded on the average 46.6 bushel less and require much more  
41 chemical to be spread on the land.

42  
43 The consumers of the world are asking for non-GMO commodities and  
44 are willing to pay a premium price. The multinational grain  
45 traders are many times offering a discount for GMOs and are  
46 offering premiums for conventional production. This is an aside  
47 from organic production which demands very high prices. GMOs are  
48 especially devastating to organic producers. Organic producers

1 will lose their certification if their production is contaminated.

2

3 The US farmers have exported from last year's harvest more than 105  
4 million bushels of corn than in the same time frame one year ago.

5 In 1995 the US claimed 72% of the world's export on soybeans. Last  
6 year, US exports fell to 58%. Many farmers think GMOs have caused  
7 this dramatic decrease in US exports. Food processors from around  
8 the world are responding to consumers' demand for a food supply  
9 that does not contain GMOs. There are estimates that the world  
10 price of corn would be 30 cents a bushel higher if the US supply  
11 was not contaminated.

12

13 Family farmers around the world are paying a heavy price because of  
14 GMOs. There are risk and liabilities also associated with  
15 producing GMOs, and yet I know not of a single insurance company  
16 willing to assume that sort of risk. If US farmers infringe on  
17 Patent Law they are liable to GE corporations who have enforcement  
18 personnel to pursue farmers whose only stand was replanting the  
19 seeds which they produced.

20

21 Neighbours in my area can attest to this fact. There are also risk  
22 and liabilities; if you are a GMO producer and contaminate your  
23 neighbour's conventional organic fields. Genetic engineering  
24 corporations have near unlimited access to the political system in  
25 the US. Because the contributions to political campaigns and a  
26 revolving door policy in our federal agencies, GE corporations have  
27 had free reign to impose their will. The senior senator from the  
28 State of Missouri, Christopher Bond, said the largest campaign  
29 contributor has been Monsanto. There has been no meaningful  
30 attempt by the Food and Drug Administration, USDA or the  
31 Environmental Protection Agency to regulate GMOs. This is because  
32 GMOs have been viewed by the agency to have a substantial  
33 equivalency of conventional seeds.

34

35 There has been wholesale ability of patents and licences to produce  
36 and distribute GMOs. In the US we have a land grant university  
37 system of colleges and universities that are funded in part by  
38 taxpayer monies. This land grant system, along with the extension  
39 service, do research and development on GMOs and the result is made  
40 available free to the GE corporations while at the same time land  
41 grant universities fail to observe their mandate to do research and  
42 develop and produce a better conventional seed supply and make  
43 those results available to the public. The failure of the land  
44 grants and the recommendation of district sellers has resulted in a  
45 decline in non-GMO seed availabilities.

46

47 Because of the consolidation in seed production there has been  
48 price increases in conventional seeds in order to make GMO seeds

1 more attractive. Because GE corporations have effectively cornered  
2 the seed and gene pool, we're now experiencing a loss of seed  
3 diversity; this is foolhardy.

4  
5 Concentration and globalisation, the technology, seeds, chemicals  
6 means the family farmers of the world will eventually become  
7 contract producers and have little to say about the operations of  
8 their farms and ranches. They will be little more than an  
9 endangered servant or the big boss who might be half a world away.

10  
11 The issues around StarLink accurately depict the credibility of  
12 genetic engineering corporations. For sometimes they have failed  
13 to comply with their agreement and it is estimated it will take  
14 nearly four years to finally get resolution to their failures.

15  
16 StarLink did not have clearance for human consumption, and yet it's  
17 found its way into the food products and commodity channels around  
18 the world. This truly points out the concept that it is possible  
19 that GMOs, conventional and organic products, do coexist.

20  
21 StarLink is responsible for increasing GMO losses to corn producers  
22 in the US. We have lost valuable export markets, and those export  
23 markets count for 20% of the total production in the US.

24  
25 Avantis failed to adhere to law as a result the farmers elevators,  
26 processors and consumers are now seeking monetary compensation.

27  
28 In the US we truly do have a discouraging set of circumstances.  
29 Farmers are producing below the cost of production with an average  
30 parity price on apparent 12 commodities of about 35%, a precursor  
31 to our situation upon the earth has been mergers and acquisitions  
32 which have brought up concentration and globalisation.

33  
34 I should say that family farmers in the US have already come  
35 together to write a farmers declaration on GMOs, which you have, we  
36 have very active in many different campaigns across the country.  
37 On December 14, 1999 the National Family Farm Coalition and the  
38 Foundation for Economics trans-initiated an international  
39 anti-trust suit against Monsanto on all conspirators.

40  
41 In conclusion I want to say this Commission and all the people of  
42 New Zealand have a wonderful opportunity to prevent themselves from  
43 finding - from their land becoming contaminated in the way that we  
44 have in the United States. We must avoid this science fiction  
45 future that a handful of the genetic engineering corporations want  
46 to throw down the throat of the people of the world.

47  
48 Let no-one tell you that you will be left behind because of your

1 failure to embrace biotechnology. New Zealand occupies a chosen  
2 spot of uniqueness and your indigenous people down through the ages  
3 have made significant contributions to this part of the world, and  
4 now New Zealand has the opportunity to again make a major  
5 contribution towards the future of the World's people. The World's  
6 people have a basic need for a safe, adequate, reasonably-priced  
7 food supply. The Commission's rejection of GMOs will help assure  
8 that those needs are met. And, I apologise for going over time a  
9 little bit here.

10  
11 CHAIR: Thank you very much Mr Christison. Can we just take advantage  
12 of having someone from the coalface, as it were, with us, which  
13 doesn't happen very often, just to get a bit more practical  
14 information on contamination.

15  
16 Now, you gave us a picture of your truck arriving at the silo, is  
17 that what you're telling us? The elevator, you call it, and three  
18 or four minutes later there will be another truck from a different  
19 farm. Were you - we're thinking specifically of what crop?

20  
21 MR CHRISTISON: Sir, this would include all the basic commodities in the  
22 United States. You know they have very fast elevator legs and you  
23 know the time is stamped on when you run on to the scales, wherever  
24 you are off, it's stamped again, and seldom ever does it take more  
25 than four minutes. The point is, is that it is virtually  
26 impossible to segregate commod - I mean, one kind of commodity from  
27 a like commodity. We do not have any problem of separating corn  
28 from soybeans, but you know, grain that looks alike, the oil seeds,  
29 it's an impossibility.

30  
31 CHAIR: All right, let's talk about grain just for an example now. Your  
32 truck arrives at the elevator and this is in bulk?

33  
34 MR CHRISTISON: Yes, they're loose.

35  
36 CHAIR: And there is a particular elevator for corn, of course, and it's  
37 there for three or four minutes what, being sucked up? Is that how  
38 it works?

39  
40 MR CHRISTISON: Most trucks in the US have belly dumps on them which all  
41 you have to do is roll open two different hoppers and all of their  
42 grain runs out through a large opening.

43  
44 CHAIR: Well now, the particular elevator would be well advertised,  
45 would it, that it is available to take either genetically modified  
46 corn or not? Is that right?

47  
48 MR CHRISTISON: That's basically true. Now, if you are hauling --

1

2 CHAIR: How is that done? I mean, is that just known or is there  
3 signage or how does it work?

4

5 MR CHRISTISON: Elevators that do offer a premium do have separate dumps  
6 that you know are not contaminated. But, most terminals are not  
7 doing that, and most country --

8

9 CHAIR: Sorry are not doing what?

10

11 MR CHRISTISON: Are not offering the option of having a - you know, the  
12 ability to segregate. Most elevators do not segregate.

13

14 CHAIR: They don't even --

15

16 MR CHRISTISON: There's no attempt.

17

18 CHAIR: They don't even claim to segregate.

19

20 MR CHRISTISON: No, that's very true. And country elevators have an  
21 especially large problem because they don't have the capacity to do  
22 that either, and in fact they run corn and soybeans through their  
23 same elevator legs and there's just a little bit of contamination  
24 between the two, is the process.

25

26 BISHOP RANDERSON: So that basically, at the average elevator there is  
27 no attempt to separate, you will get a GM load goes in and then  
28 you'll get a non-GM load gets on top and it all gets mixed up in a  
29 conglomerate?

30

31 MR CHRISTISON: That's exactly true. And another problem is that  
32 there's a limited number of very large bins of terminal elevators  
33 and you can have 100,000 bushels of clean soybeans in a bin and  
34 person bringing in a GMO and it's dumped on top and, therefore, you  
35 contaminate a huge amount of grain.

36

37 CHAIR: These elevators where there is no attempt to segregate, it  
38 follows, doesn't it, that there's no attempt to pay a premium for  
39 one or the other, it's all the same price obviously.

40

41 MR CHRISTISON: In many cases, where that there is an attempt to  
42 segregate, there is a test process.

43

44 CHAIR: Can we talk about that? There are some elevators that are  
45 offering a premium price for a non-GM crop or for a GM crop?

46

47 MR CHRISTISON: For a non-GM crop.

48

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1 CHAIR: A non-GM crop?

2

3 MR CHRISTISON: Yes.

4

5 CHAIR: And again this is advertised and is known to the farmer so, if  
6 you've grown a non-GM crop, you want to be careful to go to the  
7 right place?

8

9 MR CHRISTISON: That's exactly right.

10

11 CHAIR: So what steps are taken at such an elevator to ensure that what  
12 finishes up in the elevator is in fact not contaminated?

13

14 MR CHRISTISON: Sir, there's two different processes. If you have  
15 StarLink, or if you are going to a terminal elevator that has  
16 really been hit by the StarLink problem, that grain is going to be  
17 tested and you have to wait until the result of that test is  
18 available.

19

20 CHAIR: Is it tested off the truck?

21

22 MR CHRISTISON: Yes, for the StarLink. But, none of this testing takes  
23 place for GMOs in general, just the StarLink. And, the third part  
24 of that is, if you are getting a premium for that crop, you have to  
25 give assurances that there is no GMO in that crop. There's three  
26 parts, you know, GMO, StarLink and conventional. The corn crop  
27 that we produced last year, we expect to get a 30 cent per bushel  
28 premium on that corn because it's conventional hybrid and there is  
29 a great demand for the particular number of hybrid that we produce.

30

31 CHAIR: So, what is required of you as the farmer? Do you have to  
32 produce - does your trucker have to produce a certificate when he  
33 arrives?

34

35 MR CHRISTISON: Well, they have to - wherever you get a 30 cent premium  
36 they have to - you have to provide information that shows what  
37 hybrid you planted, you know, a voucher from your seed company and  
38 that sort of thing.

39

40 CHAIR: And does the truckie carry that with him?

41

42 MR CHRISTISON: Yes, and in my case I'm the trucker because I do my own  
43 haul.

44

45 BISHOP RANDERSON: Just developing that a bit further then. So, you can  
46 guarantee that you've planted a particular seed as per the  
47 certificate. How can you guarantee that there hasn't been  
48 contamination from a GM crop in the area?

1

2 MR CHRISTISON: And sir, you see, that is part of the problem. That is  
3 the reason that, you know, these genetically engineered and  
4 conventional hybrids, you know that's where you run into a real  
5 problem. In our particular case, we produce mostly soybeans. And  
6 in Missouri, where I'm from, that is true of nearly all farmers, we  
7 produce a limited amount of corn. But now you take a States - I  
8 mean it's not a big problem for me because I am not going to plant  
9 corn next to a GMO corn because you know there is absolutely  
10 cross-contamination.

11

12 BISHOP RANDERSON: And you don't have any GM soybean or anything in the  
13 area, that you can be pretty sure there's nothing planted here, so  
14 I can be sure it's no contamination.

15

16 MR CHRISTISON: Well, sir, there is - you know, there is a great number  
17 of GMO soybeans planted which is a self-pollinating plant, and you  
18 know the pollen isn't going to go very far, but you know it's a  
19 different situation with corn. As I stated we plant very little  
20 corn and we're very careful to put corn where it's not adjacent to  
21 any other peoples corn. In the State of Iowa, for instance, it's a  
22 large sea of corn across a large broad area and that's a part of  
23 the really big problem.

24

25 DR ALLAN: Mr Christison, so, what's to stop someone turning up and  
26 claiming that 30 cents a bushel premium who really doesn't deserve  
27 it? Like what I'm asking about, are there actual safeguards to  
28 avoid fraud?

29

30 MR CHRISTISON: Well, the safeguards is the variety of corn that you  
31 planted and there's going to be testing done on that. I mean,  
32 they're not going to say, most people in the US I think are honest,  
33 but you know maybe not all of them, and so you know, they don't  
34 want to get bit here in this process and they want to know that  
35 they're getting delivered a quality product that they're  
36 compensating the farmer for.

37

38 DR ALLAN: So it's a voluntary adherence, or is there some legal or  
39 regulatory safeguard?

40

41 MR CHRISTISON: Well, it's simply a process that you have to convince  
42 the purchaser that you have, what you say you have, and you know,  
43 that can be achieved through their tests, through your  
44 documentation.

45

46 BISHOP RANDERSON: Does it test it at the elevator? You arrive, you've  
47 got your documentation, but they'll run a test on the spot?

48

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1 MR CHRISTISON: That's true.

2

3 BISHOP RANDERSON: Before they'll let you dump it?

4

5 MR CHRISTISON: That's true. And in my case you see, unless I buy a  
6 contaminated seed, I am home free.

7

8 BISHOP RANDERSON: And just one other question that came to my mind, Mr  
9 Christison, so, was the - how far you had to travel to get to these  
10 elevators, because if they're a long way away then it's impractical  
11 really or great costs to get to them, isn't it?

12

13 MR CHRISTISON: That's exactly true. You see, that is the reason that a  
14 great number of farmers are not - cannot take advantage of the  
15 premiums that's being offered. In my case, my market is 100 miles,  
16 which you know is less than two hours. But you're exactly right,  
17 you know, the premiums - most people are not able to take advantage  
18 of the premiums.

19

20 BISHOP RANDERSON: Most are not?

21

22 MR CHRISTISON: Most are not.

23

24 BISHOP RANDERSON: So, if they wanted to grow non-GM crop that's of no  
25 value to them, it's just going to get dumped with GM crop at the  
26 closest elevator and they'll get the price for a GM crop.

27

28 MR CHRISTISON: Yes, and therein lies another problem because, the  
29 mixing together of the seeds, you know I mean, most elevators  
30 co-mingle.

31

32 CHAIR: Now, Mr Forman, have you got some questions?

33

34 MR FORMAN: Not of this witness, sir.

35

36

37 \*\*\*

38

39 [12noon]

40 MR HODSON QC: Mr Christison; my name is Hodson, I'm with the Life  
41 Sciences Network, and I do apologise for coming at you from behind.  
42 I hope it's not too uncomfortable to answer my questions and get  
43 your message across to the Commission.

44

45 CHAIR: Mr Hodson, sorry to interrupt. This is also your opportunity to  
46 cross-examine Dr Stabinsky.

47

48 MR HODSON QC: I wasn't intending to, sir.

1

2

MR CURRIE: There's still Professor Traavik too, sir.

3

4

CHAIR: I'm sorry, I've jumped ahead, have I? Yes, we should have Professor Traavik next. Yes, thank you. All right Professor, I'm sorry, I misread the timetable. Would you like to make your presentation now?

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[12.01pm]

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PROFESSOR TRAAVIK: Yes, I would like to very much.

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22

First of all I would like to say that I'm very impressed with the way that this Royal Commission is exerting its work, by having open hearings, by letting all parties being heard. I am also a member of the Norwegian Royal Commission on GMO - on health effects of GMO food last year, and that Commission consisted simply of 12 scientists going through literature. But it was followed up by a lay people hearing afterwards, but I think this is a very very good way to do it.

23

24

CHAIR: Thank you for that.

25

26

27

28

29

PROFESSOR TRAAVIK: I am here supposedly to clarify things. But I'm afraid I will disappoint you very much. Because that is in essence the conclusions for a start.

30

31

32

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36

I want to tell you two small stories because I go on to the more scientific stuff. For the first time in my life as a young scientist was invited to England to give a seminar. The moderator commented after I finished my talk that our Norwegian guest has made an excellent job here this morning, he has added considerably to the general confusion.

37

38

39

40

41

42

Now, at that time it was not intended, but today that is actually one of my intentions. Because, one of the real points I want to get through is that, the most important risk connected to genetically engineered organisms and constructs, is the lack of knowledge and predictability. That's one point.

43

44

45

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48

The other point which is also an exclusion - conclusion, is that some few years ago I was giving a talk about genetic engineering in a small town in Norway, and after my talk a very nice elderly lady came up to me and said "you know, I had expected to hear an expert here today, but I don't think you can be an expert because I understood nearly all you said". Now, that is a good point.

1

2 And secondly she said "by the way, do you know what an expert is?"  
3 And I said "well, you know, I had some Latin when I was studying,  
4 but I stole my marks and I don't remember anything of it". Well,  
5 she said, "ex" means has been, and "pert" means nothing. So an  
6 expert is a has-been, formerly nothing, okay. So I refuse to be  
7 called an expert. And the point in this connection is, there  
8 simply are no experts in the field that we're talking about today.

9

10 So, even if I wanted to be an expert, I wouldn't dare to declare  
11 myself that, because neither me nor anybody else can declare that  
12 they are really experts in this field. There's a total lack of  
13 knowledge, research and conclusive evidence.

14

15 Now, again, before I go on I would like to refer to two people. If  
16 you ask people in Norway about, do you know the name about one  
17 particular scientist in the world history? I think most of them  
18 will say "Albert Einstein". Now, I would like to quote to you  
19 something he was saying in May 1949:

20

21 "We should be on our guard not to overestimate science and  
22 scientific methods when it is a question of human  
23 problems. And we should not assume that experts are  
24 the only ones who have a right to express themselves  
25 on questions affecting the organisation of society".

26

27 I think those are still very very wise words, and I feel that  
28 that's exactly what this Commission is trying to do. But, of  
29 course, they have to hope on honest and open witnesses in order to  
30 draw the right conclusions.

31

32 I want to mention one thing. Sir Joseph Rotblatt, the Nobel Peace  
33 Prize laureate, had a commentary in Science last year called "A  
34 Hypocratic Oath for Scientists".

35

36 [Overhead shown]

37

38 And, I'll show it here. Now, the main conclusion is there in the  
39 frame; "scientists can no longer claim that their work has nothing  
40 to do with the welfare of the individual or with State politics".  
41 That should be at this time in history something that was kind of  
42 self-evident, but it isn't. And if you could please get to the  
43 bottom of this [overhead moved], I would like to read out for you  
44 what Sir Joseph Rotblatt is suggesting as a hypocratic oath.

45

46 "I promise to work for a better world where science and  
47 technology are used in socially responsible ways. I  
48 will not use my education for any purpose intended to

1 harm human beings or the environment. Throughout my  
2 career, I will consider the ethical implications of  
3 my work before I take action. While the demands  
4 placed upon me may be great, I sign this declaration  
5 because I recognise that individual responsibility is  
6 the first step on the path to peace".

7  
8 Again, I am not suggesting that the majority of the scientists of  
9 this world are not applying the principles which are inherent in  
10 this oath; but, I would imply that many scientists are still saying  
11 that "I'm doing science that's objective and neutral, and society  
12 is responsible for the consequences it will have if my results are  
13 being applied". And that, I think, is no longer the case, and it  
14 should particularly not be the case for the scientific field we're  
15 talking about here today.

16  
17 I want to add a couple of words about who I am and why I became a  
18 sceptic towards applications of genetic engineering. Having used,  
19 in a research group composed of about 15 to 20 people at any given  
20 time, all the methods that are being included in the expression  
21 "genetic engineering" for the past 20 years; and, very central in  
22 our research has been exactly the methods that are still being used  
23 in order to create genetically engineered organisms, cells and  
24 organisms.

25  
26 Until about 10, 12 years ago, I was one of the proponents, the  
27 really hard core proponents of genetic engineering. I mean, the  
28 thing was, there was a revolution going on which will improve the  
29 earth and give mankind a lot of benefits, and I'm part of it.

30  
31 Now then, what happened was, that doing exactly the kind of  
32 experiments and using exactly the kind of methods that are being  
33 used in order to create genetically engineered crops and animal  
34 organisms, I experienced the following: For scientific purposes it  
35 is sometimes very very interesting that you cannot target the  
36 integration of your favourite gene to a specific site, because that  
37 gives you the possibility to monitor how integration is co-acting  
38 with the endogenous genes of your recipient's genome. And, as a  
39 cancer biologist, that is giving me the opportunity to see how  
40 endogenous cancer teams and tumor suppressor genes are being  
41 affected by integration and by promoters that we can choose.

42  
43 But, by the same token, when you use these methods in order to  
44 release them, then you have already created something which is  
45 inherently unpredictable when it comes to a lot of biologically and  
46 ecologically important characteristics.

47  
48 Now furthermore, in the kind of research I'm doing we can see that,

1 if you integrate small DNA fragments down to a size of 20  
2 nucleotides, you may have a tremendous effect on the - on some  
3 phenotypic characteristics of the recipient cells. So that, when  
4 people are talking about problems with horizontal gene transfer,  
5 for instance, it's often assumed that you have to have intact gene  
6 transfer in order to see problems, and that's simply not the case.  
7 Because, 20 nucleotides may contain motives for a promoter or  
8 enhancer activity, and that may influence a lot of genes up to 100  
9 kilobase up and down from the integration site of that small DNA  
10 piece.

11  
12 And this is very important because, the genetic modification  
13 methods are such that not only can you not predetermine where you  
14 want your genetic insert placed and inserted, but you will very  
15 often see that you have more than one piece of foreign DNA being  
16 inserted. And, since you select for having your transgene  
17 expressed, that is all you care about; if the plant or the animal  
18 looks like any other animal and you have your foreign gene  
19 expressed, that is primarily what you are happy about for a start.

20  
21 But, in addition you will very often have, as I said, small pieces  
22 of DNA inserted and you will not automatically detect these in  
23 search unless you do very targeted, pointed research for them.  
24 Exemplified, one of Monsanto's transgenic plants, seven years after  
25 it was approved, it turned out that there were extra pieces of DNA  
26 within the genomes of that transgenic plants. And, I cannot decide  
27 whether that happened as a result of the original insertional  
28 event, or these extra pieces which appeared were made afterwards  
29 and reinserted, because both those explanations are valid and they  
30 go to undiscovered unpredictability of these kind of techniques.

31  
32 Now, so much about the first thing I realised. I realised then  
33 that, if the interesting things that I was observing and publishing  
34 with my model systems of human and other mammalian cell system, if  
35 these things were placed in real life in ecosystems that were much  
36 more complicated than the artificial model system I was working in,  
37 these might be the basis for real, and we shouldn't use -  
38 scientists are not supposed to use strong words - but these might  
39 be the basis for real ecological and health catastrophes; that's a  
40 fact.

41  
42 I still cannot prove that it is taking place at the moment, but I'm  
43 still quite convinced, and there's still coming in - or, there is  
44 coming in all the time results and data that underscores that  
45 conclusion.

46  
47 The second point I put up here, that goes to prove something that  
48 is important when you are discussing science. Now, by the time we

1 made some experiments in rabbits, where the controls were to inject  
2 naked viral DNA intra venally to the rabbits; by that time, all  
3 conventional wisdom, all reviews, scientific reviews underscored  
4 that naked DNA, do not pose a threat to nature or to mammalian  
5 organisms because simply, as soon as the organism or the ecosystem  
6 is seeing this DNA, it will be chopped up by enzymes into  
7 meaningless building blocks for nucleic acids, and that's what we  
8 assume would happen. And in the parenthesis, long into the 1990s,  
9 a lot of proponents of genetic engineering still went around saying  
10 that this was the real situation.

11  
12 But I became aware about this simply by something I considered a  
13 negative experiment. We injected foreign DNA from a virus which is  
14 not able to infect rabbits. We were studying autoimmune responses.  
15 But the naked DNA was able to initiate a full infectious cycle in  
16 the rabbits, which proved that this DNA was not at all behaving as  
17 the scientists wanted it to behave, and that is, of course, a  
18 problem in science, that nature very seldom obeys the rules that  
19 the scientists wants it to obey.

20  
21 So again, from this experience it became clear to me that some of  
22 the dogmas that the biosafety research by that time was based on  
23 were definitely wrong. And, I'm sorry to say, that hasn't improved  
24 very much during that 10 years that has passed from that moment.

25  
26 One of the problems, of course, is that, no - don't quote me on  
27 this because I don't know the actual figures - but if I say that  
28 95% of all qualified molecular biologists and genetic engineers in  
29 this world is in one way or another directly concerned with the -  
30 concerned with the productional applications of genetic  
31 engineering, and many of them have direct links to producers, while  
32 5% of highly qualified molecular biologists are truly independent.  
33 I don't know these percentages, but I think it's not so farfetched.

34  
35 Of course, the scientists that work on production projects are  
36 perfectly allowed to do so, and many of these projects are returned  
37 to that; I think personally may give benefits and advantages to  
38 mankind, but what is also evident is that you cannot be a genius in  
39 two very different fields at the same time. Most of us are not in  
40 one field at a time, even.

41  
42 And the point by saying that is that, very often still, biosafety  
43 related research is integrated into projects which have more than  
44 anything else a productional goal. And, to be very innovative and  
45 creative about the probable hazards and the harms about your own  
46 work is as far as I know not the easiest way for a human brain to  
47 work. It's more or less like driving your car at 200 kilometres an  
48 hour with the brakes on.

1

2

So the only solution to that problem is that the society as such must create truly independent research groups which are having biodiversity and biosafety issues as their main projects. That's a must. If the society doesn't do that they will not get the kind of knowledge which we lack now, which Dr Stabinsky has said a lot about, very very - very very good. So, that's one of the things that we have to get in place; it's not there now.

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Let me say that 10 years ago when I said things like this, I was very controversial, of course, in scientific circles. I even lost some good friends on saying things like this. But now, I am still saying more or less the same thing as I did 10 years ago, but the stage has changed. So now I'm in the middle. In Europe I would be considered to be actually quite in the middle of the stage. Because there has been such a lot of results which were not directly aimed at biosafety questions, but they have still popped up which are underscoring the message that I have been delivering the last 10 years.

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But of course they are not conclusive. Nobody have granted really big conclusive projects to study biosafety hazards related to genetic engineering.

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So, these problems that I started with are still there; they are not at all clarified, they are not away from the table, they are connected to any genetically engineered organism that had been produced so far. Whatever they are going to be used for, whatever area of application, medical, agronomical, whatever, they have been produced by the same kind of procedures, methods, they are lined up, and they have the same kind of unpredictability when it comes to both health and environmental effects.

DR FLEMING: Professor Traavik, can I just clarify something concerning the second of your points there. You injected a full viral genome of a virus that normally did not infect rabbits?

PROFESSOR TRAAVIK: Yes.

DR FLEMING: And you found, I think you said, the full infective cycle. Did this mean that viral particles were produced?

PROFESSOR TRAAVIK: That means that full viral particles were produced in the rabbits.

DR FLEMING: And did you find incorporation in the rabbit genome?

PROFESSOR TRAAVIK: Yes, I would assume to have that because for that

1 virus that is kind of a byproduct of the replicative cycle.

2

3 DR FLEMING: Thank you, that's exactly what I wanted. Thank you.

4

5 PROFESSOR TRAAVIK: Now, I want to turn to something else. I want to  
6 say something about risk and risk assessment, even though  
7 Dr Stabinsky has said a lot of very very correct and wise things  
8 about that, but I want to add something.

9

10 Of course, I want to put up this simplified definition of risk.

11

12 [Overhead referred to]

13

14 Which is simply saying that risk and probability, many people, and  
15 even scientists and media and politicians, confuse risk and  
16 probability. But as we should all know, risk is, as probability  
17 for an unwanted event to happen, multiplied by the consequences it  
18 will have if that event happens. Which, of course, means that an  
19 unwanted event which is carrying a low probability will still carry  
20 a very very high risk if the consequences are serious enough.

21

22 Now, unfortunately during the last 50 years we have seen very  
23 serious examples of what happens when science, society,  
24 politicians, do not really take into account what this equation  
25 means.

26

27 I will just mention a couple of examples. Obviously, in order to  
28 be able to make risk assessments for any new technology you need to  
29 know all the unwanted events. And for each single of them you have  
30 to put them into this equation and that's the only way you can do  
31 risk assessment.

32

33 Now, if you go back to the hormone disrupting chemicals that we  
34 have already polluted our beautiful planet with, at the time that  
35 they were introduced all the best risk procedures, scientifically  
36 based, were used and the conclusion was that some of these  
37 substances were not at all dangerous to health or environment.

38

39 Now later on, 40 or 50 years later, we see that they were  
40 dangerous, both to environment and to mankind. But simply the  
41 problem was that, the biological phenomenon which is creating the  
42 worst biohazard, namely biomagnification, within nutritional  
43 chains, were not known at the time that the risk assessments were  
44 none. Or I should rather say, it was not accepted by mainstream  
45 science.

46

47 The other example is the BSE epidemic with the linked variant Jacob  
48 Creutzfeld disease in human beings which is now taking place all

1 over Europe. Now, there was a 16 book report coming out in England  
2 in October last year, and that is just a consecutive harsh critic  
3 of politicians and scientists and regulators for just taking their  
4 advice from science that you wanted to hear.

5

6 Now, the whole problem with BSE, and we still don't know what this  
7 means in the longer run for human health, was that the risk  
8 management was based on two dogmas which were later on disproved of  
9 them. One, that the BSE prions were not able to jump the species  
10 barrier between cow and man. And that was a dogma in spite of the  
11 fact that prions had already been shown to jump species barriers.  
12 The reason we know about prions at all, is that species from kuru,  
13 from Papua New Guinea, can be inoculated in mice and give symptoms.  
14 In spite of that, the whole official handling of the BSE epidemic  
15 was based on, prions don't jump species barriers.

16

17 Second thing was, that was claimed from scientists and from  
18 politicians that it was only part of the central nervous system  
19 that were infectious for prions. Now, can you imagine? I mean, my  
20 first year students will say "how can something jump directly from  
21 the central nervous system from one individual over to the central  
22 nervous system of other? Of course it has to pass from the  
23 periphery of the body to get to the central nervous system. And  
24 hence other parts of the body must be infectious.

25

26 Now, to come to the conclusion about risk. There are three equally  
27 probable theories about the origin of the BSE prions. One is, of  
28 course, what has been most talked about, that these came from  
29 offal, from slaughter offal and came originally from sheep and  
30 goats which have their own prions.

31

32 The second theory is that this is not at all coming from other  
33 domestic animals, but it's coming from some wildlife species that  
34 have got into the cattle food chain. And the third is, that the  
35 whole epidemic and the human health problems are due to one single  
36 point mutation in one single cattle individual in the UK sometime  
37 in the 1970's.

38

39 I don't know which of these theories is the correct one, but I want  
40 to underscore for you that, if you put the last one about one  
41 single point mutation in one single cattle in this equation, and  
42 you thought about the probability, you will just say, well, if  
43 somebody said that this might happen, he's crazy, it's not  
44 possible; right? Which goes to prove that probability and risk is  
45 two very very different concepts.

46

47 Now, my problem is that I see that we are in the process now of  
48 doing pretty much the same mistakes as were done with the BSE

1 epidemic in the 80s and 90s when it comes to genetic engineering  
2 and particularly release of genetically engineered organisms. And,  
3 I'm not the only one who says that. I mean, in Europe there are no  
4 editorials in first frontline scientific journals talking about the  
5 risk of bias from admitted research talking about genetic  
6 engineered crops, the urgent need for scientific scrutiny, talking  
7 about monitoring and labelling for genetically modified products.  
8

9 And, I'd like to just - we don't have to show this, I'd like to  
10 just quote something. This is an article by Alexander Hasselberger  
11 from Science in the Year 2000, and he quotes Ben Mifflin, former  
12 director of the Institute of Arable Crops at Rottenstead(?) that  
13 said that, only health effects representing a monumental disaster  
14 will be detectable under the original regulations - which is your  
15 original EU regulations which were considered to be good  
16 regulations.  
17

18 And I think, that is the point simply because I have another  
19 article here which you have heard about I think already, and that  
20 is, Domingo's letter to Science from last September, with the title  
21 "health risks of GM foods, many opinions but few data". There is  
22 challenging both sides. He has gone through the databanks and he's  
23 found 160 articles concerning health effects of the genetically  
24 modified food, and he find seven or something which at all are  
25 based on experimental or empirical data, and he challenged both  
26 sides and say, if the industry, if the producers have really hard  
27 experimental facts to prove safety, well show them and publish them  
28 in peer-reviewed journals, and on the other side, if there aren't  
29 any good science in this field, why is that? And that is a good  
30 question.  
31

32 Time? Five minutes? Let me use one of the minutes to give a  
33 version of the Precautionary Principle that I'm using. And that  
34 is, as Dr Stabinsky mentioned, that is the version that was worked  
35 out for the North Sea negotiations. Now it's the last period here  
36 that is important. "Where there are threats of serious,  
37 irreversible damage, lack of scientific certainty should not be  
38 used as a reason for postponing measures to prevent environmental  
39 degradation".  
40

41 The point I want to make here is not regulatory or ethical, but it  
42 is that when we're talking about biosafety, the Precautionary  
43 Principle is also the soundest and best basis for science and  
44 research. Because, in order to do good science you have to have  
45 the right hypothesis and you have to have the right design of  
46 experiments, and you have to simply do the right kind of research  
47 in order to answer questions that you have posed in advance.  
48

1 If you go by a zero hypothesis saying that there is probably no  
2 difference between genetically modified and unmodified versions of  
3 a given organism, then your experiments will be designed in one  
4 way. Any questions you ask will be different.

5  
6 If you have the zero hypothesis that there may be differences, then  
7 you, your experiments and your questions will be different. And  
8 that is really what is needed now, is to use the Precautionary  
9 Principle as a basis; one, to make good laboratory experiments and  
10 two, what is more needed than anything else, is a new research area  
11 where we try to use our creativity to make good model systems in  
12 order to look at ecological interactions.

13  
14 Of course, it's claimed that field trials is the only way to do  
15 that but, as you will know, field trials doesn't get rid of the  
16 problem that a field is just placed one particular locality in the  
17 world. So, the results you get are only valid for that particular  
18 place and those particular circumstances.

19  
20 The usual experiments that we're doing, that I'm doing too, are  
21 reduced conditions where you put in as few components as possible,  
22 because that makes it easier to control the experiments. But it's  
23 so far from the real world as you can get.

24  
25 So, the notion I want to make is that, there is simply one line to  
26 be drawn when it comes to genetic engineering, and that is between  
27 contained use and production on one hand, and release on the other  
28 hand.

29  
30 According to - it's difficult perhaps to really define what  
31 containment is in this connection. In the Norwegian Gene  
32 Technology Act, for instance, even greenhouse experiments are,  
33 because simply the - in greenhouses without particular insulations,  
34 the chances of release of genetic material is there all the time.

35  
36 Now, when I talk about containment, I talk about laboratory  
37 conditions where there are only natural catastrophes that may give  
38 the effect that genetic material is escaping. So the purpose of  
39 the containment is to use genetic engineering to produce a product  
40 which is usually a protein, and only this protein product is coming  
41 out of the lab, the containment.

42  
43 A lot of good genetic engineering and very very beneficial positive  
44 products have come out of that kind of production already. It's  
45 much safer than release, it gives products that are often much  
46 cleaner, for instance for medical use, than traditional products,  
47 and it does not represent the same kind of risks; and you are able  
48 to make risk assessments for that kind of use of genetic

1 engineering, which is a very very important point here.

2

3 So, whatever kind of genetic engineered organisms we're talking  
4 about today, they have been made by the first generation of  
5 technology, which I don't think deserve the word "technology" at  
6 all, because it is untargeted integration and unpredictable results  
7 of that integration. There will be new generations of technology.  
8 The first generation of technology are transgenics. In other  
9 words, you put in foreign DNA from another source.

10

11 Now, even if producers and BACRRE, the British Advisory Committee  
12 for Research and Releases into the Environment have considered  
13 this, and in a report they gave out last fall they said that, for  
14 the future, as little as possible and rather no foreign DNA should  
15 be used for genetic engineering. The emasculating are there, and  
16 they are intra-genetics. To either buy a form of genetic surgery,  
17 change sequences within already endogenous existing genes in your  
18 target organism, which is fully possible, the first scientific  
19 articles using that successfully have already been out, so that's  
20 one strategy.

21

22 The other strategy comes from - that's one of the beneficial  
23 results in my mind of the genome sequencing projects. That the  
24 banana and the human being have a lot of genes in common. Some of  
25 these genes may have potential medical beneficial uses for  
26 instance; but the banana genes are not expressed, but you may by  
27 chemical and other purposes enforce expression of the genes in the  
28 banana. Okay, that's the other strategy which will be used.

29

30 In both these types of new strategies you get around some of the  
31 worse risk elements and potential hazards of the first generation  
32 technology; namely, the whole set of problems associated with the  
33 integration of foreign DNA per se, and specifically with  
34 integration of a new promoter enhancer. Because you simply do not  
35 put in any foreign DNA and you do not tamper with the existing  
36 control elements of the genes.

37

38 I'm not saying that these strategies are not without biosafety and  
39 socioeconomic and other problems; they have to be evaluated on a  
40 case-by-case, step-by-step procedure, and they have to be evaluated  
41 by a new set of techniques and new scientists, but they do take  
42 care of some of the problems we have in the first generation.  
43 Therefore, we should let science go on and stop the use of the  
44 first generation of genetically engineered plants. Thank you.

45

46 MS COTTER: The other two witnesses that we were calling upon, there's  
47 been a shuffling around of the time - Anuradha is scheduled for  
48 2 o'clock? [Ms Cotter confers with colleagues]. She is scheduled

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1 for 3.30, and she will be speaking for 15 minutes.

2

3 CHAIR: So, is there any change in the schedule?

4

5 MS COTTER: No, there's not, and Professor King will be available for  
6 cross-examination.

7

8 CHAIR: Mr Forman, questions of any of the witnesses we've heard this  
9 morning?

10

11

12 \*\*\*

13

14 [12.45pm]

15 MR FORMAN: I'll address my question to Ms Cotter, but it may be that  
16 other members of the panel may wish to answer as well. My name is  
17 John Forman, I'm with Lysosomal Diseases New Zealand, and also the  
18 New Zealand Organisation for Rare Disorders. I noted that the  
19 presentation is almost entirely about matters related to the  
20 environment, food and ecology. And, it seems quite significant to  
21 us, as a group who are interested in diseases and medical  
22 application, that there is no reference in your submission to  
23 medical applications of GM technology. Can I ask if there's any  
24 particular significance that the Commission or we should draw from  
25 that?

26

27 MS COTTER: The distinction that Greenpeace makes is, as has been said,  
28 between contained use and the release into the environment - so I  
29 think Doreen, you may be best placed to address the issue.

30

31 DR STABINSKY: Well sure, it's just an elaboration of that point, that  
32 is, the majority of the medical uses of genetic engineering are  
33 contained use, are in contained facilities. So, the production of  
34 pharmaceuticals within a contained facility, Greenpeace doesn't  
35 have a position against. We do have a position against the  
36 production of pharmaceuticals in animals that are out in the open.

37

38 MR FORMAN: I didn't note that that was contained in your submission,  
39 although you've made that statement now. Is that a new addition to  
40 your position?

41

42 DR STABINSKY: It's not a new addition to our position, it's a further  
43 elaboration on our distinction between contained use and field  
44 testing, that in fact animals in the environment are field releases  
45 of an organism.

46

47 MR FORMAN: The Green Party, the Save Animals From Exploitation and a  
48 number of other environmental groups made considerable comment on

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1 the use of genetic modification for medical applications. Was  
2 Greenpeace's I guess relative silence on that issue quite a  
3 deliberate decision?  
4

5 DR STABINSKY: It's just reflective of our international position on  
6 genetic engineering. That is, we're an organisation that campaigns  
7 on environmental issues, and we've taken a position internationally  
8 against the release into the environment of genetically engineered  
9 organisms and we don't campaign on the medical use or contained use  
10 of genetically engineered organisms.  
11

12 MR FORMAN: So in fact, the organisation decided to stick to its field  
13 of expertise of interest? Is that the essence of the response?  
14

15 DR STABINSKY: Uh-huh.  
16

17 MR FORMAN: Well, I would thank you for that, and just comment that I  
18 wish a number of other groups had done the same. No more  
19 questions.  
20

21  
22 \*\*\*  
23

24 [12.47pm]

25 MR HODSON QC: If I could start with Professor Traavik essentially to  
26 clear up some paperwork I think, and then go on to some other  
27 topics. Professor Traavik, the example you gave us with reference  
28 to rabbits, can you give us any reference to any publication on  
29 that topic?  
30

31 PROFESSOR TRAAVIK: To my work on rabbits?  
32

33 MR HODSON QC: Yes please?  
34

35 PROFESSOR TRAAVIK: I can give you that, do you want me to give it now.  
36

37 MR HODSON QC: Perhaps at lunchtime?  
38

39 PROFESSOR TRAAVIK: There's a series of three peer reviews out on the  
40 subject of that.  
41

42 MR HODSON QC: Thank you. In the material which was handed to us before  
43 you started, one of the publications is called Centres of Diversity  
44 by Greenpeace, and perhaps if somebody could show you that  
45 document, page 9.  
46

47 CHAIR: H 233.  
48

1 PRODUCED AS EXHIBIT H 233

2

3 MR HODSON QC: The article in a box, danger from promiscuous plants, and  
4 it comes from the September 1998 work of Professor Bergelson, which  
5 I think you're familiar with; and this article uses words like  
6 alarming, fearsome, disastrous. I note that the magazine New  
7 Scientist the following month conducted a lengthy article on  
8 wildness, genetic engineering and so forth, interviewing a number  
9 of people, and touched on this topic. And, I'm just going to read  
10 you a brief passage to see if you're familiar with it.

11

12 Dealing with the work of Professor Bergelson, it says that she  
13 wanted to see how herbicide resistant plants might fare if they  
14 escaped into neighbouring fields and hedgerows where herbicide was  
15 never sprayed. The answer for Thale cress weed at least, that's  
16 the same as - is "badly" in a field containing a mixture of  
17 transgenic and non-transgenic plants where no herbicide was  
18 sprayed, the transgene disappeared after five generations.

19

20 Bergelson concluded that production of the herbicide tolerance  
21 protein meant the plant had to spend more energy which in the  
22 absence of herbicide spelt death in the struggle for existence.  
23 Studies showed that the same is true in many other crops, including  
24 tobacco, oilseed rape and rice. If it escapes from farmers' fields  
25 the herbicide resistance gene is more likely to create puny weeds  
26 than superweeds. Are you familiar with that particular line?

27

28 PROFESSOR TRAAVIK: I'm familiar with Professor Bergelson's work, yes.

29

30 MR HODSON QC: Is that a representation of it?

31

32 PROFESSOR TRAAVIK: I would say that her work is best concluded by  
33 herself, and she has never intended to show anything about final  
34 dangers or anything like that. She's simply recorded what she saw.  
35 Now, you have to realise that, as I said, when you choose a set of  
36 experimental conditions, you also exclude a lot of potential  
37 conditions and parameters. So that, the results you achieve will  
38 be directly related to the experimental conditions you have chosen,  
39 but now scientists will say from experiments such as that no has  
40 been proven or disproven from such an experimental element. What  
41 I've been talking about is for more authentic model systems in  
42 order to study these kind of effects over longer periods, and with  
43 a set of varying climatic and other ecosystem varieties. And as I  
44 said, this is the kind of model systems that we like.

45

46 MR HODSON QC: Thank you for putting that in context, and it brings me  
47 to the other question I had. Last week there was tabled before the  
48 Commission an extract from Nature magazine of the 8th of February

1 containing an article, a paper by Cawley and others, reporting on  
2 the results of a long-term study of the performance of transgenic  
3 crops in natural habitats. Four different crops, oilseed rape,  
4 potato maize and sugarbeet were grown in 12 different habitats and  
5 monitored over a period of 10 years. In no case were the  
6 genetically modified plants found to be more invasive or more  
7 persistent than their conventional counterparts. I know it's only  
8 a week old, but have you come across that article?  
9

10 PROFESSOR TRAAVIK: I have, unfortunately - you see, this is not my real  
11 language - I have been travelling all the time lately, I have not  
12 seen the 8 February edition of Nature. But I think that, even so,  
13 from the quotation you made, I will say that in order to draw the  
14 conclusion that you have no more persistence, no more gene flow and  
15 so on and so on from the kind of experiments that these seem to be,  
16 would not be scientifically correct. You would have to have much  
17 longer periods of studies, and you would have to use methods which  
18 have not been used here.  
19

20 Because, I forgot to say during my own presentation that the modern  
21 functional genomics will come to our help for studying effects here  
22 in this field, but they haven't been put to work really yet. We  
23 are now doing that with proteomics for corn plants that we grow  
24 under different climatic conditions, presumably we could also  
25 include the New Zealand conditions.  
26

27 MR HODSON QC: Well, you're not here to say that, but yes.  
28

29 PROFESSOR TRAAVIK: The point is that for all methods that have been  
30 applied so far, you can only get answers according to the questions  
31 you ask, and of course that's in all molecular biology methods up  
32 till now. But the new functional genomics methods gives you the  
33 opportunity to get answers to more than you ask for. In other  
34 words, can you reveal the total difference in gene expression  
35 between two plants who have been cultivated under different  
36 conditions, and that gives you possibility also when it comes to  
37 revealing allergenic reactions, toxic reactions and so on, and I'm  
38 quite sure that the producers also will use that kind of series  
39 more and more.  
40

41 MR HODSON QC: I think we can all be quite sure that that article will  
42 produce some commentary and debate in future.  
43

44 Thank you very much for Professor Traavik and I'm sorry for  
45 digressing. If I could come back to you Mr Christison. On the  
46 topic that the Commission was taking up with you, the certification  
47 of StarLink, or the testing for StarLink that you described, was  
48 that as a result of the StarLink disaster becoming known; that it

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1 became tested for?

2

3 MR CHRISTISON: That's true.

4

5 MR HODSON QC: So, before the contamination experience, it wasn't tested  
6 for?

7

8 MR CHRISTISON: No, it was not tested at the elevator.

9

10 MR HODSON QC: Could you help us just on one other topic. In your  
11 State, are there any organic farmers; that is, certified organic?

12

13 MR CHRISTISON: Yes, there is. In fact, we have some certified organic  
14 production areas on our farm.

15

16 MR HODSON QC: On your farm?

17

18 MR CHRISTISON: Yes.

19

20 MR HODSON QC: Well, I'm sure that the Commission would be interested to  
21 know how you maintain your boundaries, how you maintain your  
22 certification when there is also genetically modified crops being  
23 grown in the State.

24

25 MR CHRISTISON: We are very selective on the areas that we can use for  
26 organic production, and it has to be not adjacent to other open  
27 crop plants that could be planted in GMO crops.

28

29 MR HODSON QC: Are there specific degrees or distances of separation for  
30 different specific crops?

31

32 MR CHRISTISON: Yes, there is. You know, there's different crops that  
33 will pollinate greater distances.

34

35 MR HODSON QC: What's your certifying body, Mr Christison?

36

37 MR CHRISTISON: It is the national certification process - there is two  
38 different processes in our area.

39

40 MR HODSON QC: And are those both affiliated to the IFOAM organisation?

41

42 MR CHRISTISON: To the, which?

43

44 MR HODSON QC: The international body that the organics adhere to?

45

46 MR CHRISTISON: I do not know the answer to that.

47

48 MR HODSON QC: That might be a convenient moment, sir.

1

2

CHAIR: Yes, all right. We'll take the lunch break until 2 o'clock.

3

4

5

Adjournment taken from 1.00pm to 2.00pm

6

7

8

CHAIR: Mr Christison?

9

10

MR CHRISTISON: Sir Thomas, I would feel the need to expand a little bit on the last question that was asked before the break, and if you would allow that?

11

12

13

14

CHAIR: Yes. Would you just remind us all what it was?

15

16

MR CHRISTISON: We were talking about the organics question, about organics, that - and how that that works on our farm, and I gave an answer relative to our farm. I think I should speak in a little broader sense. And the situation on our farm is that, we're protected by rivers and woods and, you know, we have a different situation than most people have. The area that we live in is not all tillable land, there's much land that has other uses, crops are not grown on it.

17

18

19

20

21

22

23

24

25

In areas like Illinois, Iowa where there's, you know, one field joins another field, two inches apart, you know, organic production is truly a problem. It's not particularly on our farm. And so, you know, I think that this Commission would do well to consider the economic benefit that New Zealand has in the ability to produce non-genetic products that could supply a seed base for much of the world that is being contaminated now, if there is some way that we could get the world cleaned up a little bit. Thank you.

26

27

28

29

30

31

32

33

34

CHAIR: Thank you for that.

35

36

37

BISHOP RANDERSON: Could I just ask about that. Is there any emerging movement within the US, for example, to have areas that become more organic? I mean, you seem to have a fairly natural one where you are, but is there a move perhaps to promote such areas as a way of maintaining organic farming in the presence of GM in other parts?

38

39

40

41

42

MR CHRISTISON: Well actually, sir, I have a document here that is a Bill that is before the Montana State legislature.

43

44

45

46

BISHOP RANDERSON: Yes, we noticed that, and we were going to ask about that and how it's getting on.

47

48

MR CHRISTISON: There is a process going on and they are trying to

1 develop a GMO free area for especially wheat because that is a  
2 major component of bread and everybody uses that on a daily basis.  
3 And so, they are really pushing hard to make that a reality.

4

5 BISHOP RANDERSON: Is that a fairly isolated instance at this point, or  
6 do you see a movement of that sort gathering momentum around the  
7 country?

8

9 MR CHRISTISON: Well, there is much interest in organic production  
10 across the United States, but there is a tremendous problem, you  
11 know, with contamination and the loss of your certification.

12

13 BISHOP RANDERSON: We know what the problem is; what we're interested in  
14 is what's actually being done to deal with it and whether those  
15 types of movements that you describe are beginning to happen in  
16 other places as well?

17

18 MR CHRISTISON: Well, you understand it takes some time to get a  
19 certification.

20

21 BISHOP RANDERSON: Yes.

22

23 MR CHRISTISON: And there is different people going through that process  
24 in hopes that they can get certified and get a better return on  
25 their production, because we have simply a deplorable situation  
26 with family farm agriculture in the United States because of  
27 industrial agriculture and GMOs. Does that answer your question?

28

29 BISHOP RANDERSON: Well, I'm sort of gathering that there's not much of  
30 a concerted movement at this stage, that people are just becoming  
31 aware of the problem. There are one or two examples like Montana  
32 where they're trying to do something about it, but at this stage  
33 I'm not hearing that there's a concerted growth in the response.

34

35 MR CHRISTISON: I think this is in the beginning stages at this point in  
36 time and, you know, that is brought on by the consumers of the  
37 world not wanting to consume GMOs and, you know, in places like  
38 Japan and Europe that are so much interested in GMO free. We have  
39 from time to time contacts with people in Europe and, you know,  
40 there is very large premiums being offered there in Europe. I mean  
41 --

42

43 BISHOP RANDERSON: I know, we're aware of all that. I think it's your  
44 words that "in the beginning stages" people are just becoming aware  
45 of the problems and gathering their forces to make a response to  
46 it.

47

48 MR CHRISTISON: I think that's true.

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1

2 BISHOP RANDERSON: That's very helpful.

3

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5

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6

7 [2.05pm]

8 MR HODSON QC: Mr Christison, I would like to hear more about your  
9 organic practice. What sort of organic crops do you grow?

10

11 MR CHRISTISON: We grow organic soybeans.

12

13 MR HODSON QC: Organic soybeans. Anything else?

14

15 MR CHRISTISON: No.

16

17 MR HODSON QC: Are they taken to an elevator? How do you get them off  
18 the farm?

19

20 MR CHRISTISON: No, organic is not processed in that manner, it's a  
21 small industry in the United States and this is done through small  
22 regional processing plants that - we have a couple of three in  
23 Iowa, we have at least one in the State of Missouri.

24

25 MR HODSON QC: How do you get your soybean to the processing plant?

26

27 MR CHRISTISON: In my truck.

28

29 MR HODSON QC: And you use the same truck that you use for carrying your  
30 non-organic crops, or do you have to wash it out or use a different  
31 truck?

32

33 MR CHRISTISON: Well, our truck sicks out very clean wherever you open  
34 the belly dumps.

35

36 MR HODSON QC: I know you told us before but we didn't get a moment to  
37 write it down, could you tell us who certifies your organic  
38 business?

39

40 MR CHRISTISON: We have a certification through the national  
41 associations that is headquartered in Nebraska in our area.

42

43 MR HODSON QC: Could you give us its title or name or whatever so we can  
44 see what its rules are and compare it with whatever we might  
45 achieve here?

46

47 MR CHRISTISON: I could make that information available to you, but I'd  
48 have to return home before I can do that; but I could get that for

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1 you.

2

3 MR HODSON QC: I would be very grateful if you would.

4

5 MR CHRISTISON: I'll do it, and that information I should send to the  
6 Commission, is that correct?

7

8 MR HODSON QC: Yes please, and we can recover it from there. And  
9 you've actually got two organic certifying bodies operating in the  
10 State of Missouri?

11

12 MR CHRISTISON: Yes.

13

14 MR HODSON QC: Are they in competition with each other or complementary?

15

16 MR CHRISTISON: No, they are not in competition as far as I know. You  
17 know, they work - you can either be in a state association or the  
18 national association, whichever you choose.

19

20 MR HODSON QC: Or both?

21

22 MR CHRISTISON: I don't know that.

23

24 MR HODSON QC: Which one are you in?

25

26 MR CHRISTISON: National.

27

28 MR HODSON QC: Mr Christison, have you had the opportunity to travel  
29 around New Zealand and see how farming is done here, with the same  
30 sort of crops that you grow?

31

32 MR CHRISTISON: Well, I have travelled - I just made one trip, a little  
33 ways into New Zealand there to look at a dairy operation, and our  
34 primary crop is soybeans and we - I haven't seen any soybeans, but  
35 I did see some fields of corn.

36

37 MR HODSON QC: I hope you get the opportunity to spend a little time in  
38 our country.

39

40 MR CHRISTISON: I look forward to doing that.

41

42 MR HODSON QC: You spoke a moment ago of the economic issues and your  
43 concern about the return to farmers as opposed to the return to the  
44 makers of the genetic product. Now, the farmer has a choice,  
45 hasn't he, whether or not he goes the GM way or not?

46

47 MR CHRISTISON: Well, actually not. There is very little choice  
48 wherever there is so much of the US that is farmed continuously for

1 miles, because of contamination.

2

3 MR HODSON QC: All crops or simply wheat or simply soybean or, what?

4

5 MR CHRISTISON: Much of the Midwest is planted in corn and soybean  
6 rotation, then farther to the west is where the wheat comes into  
7 play.

8

9 MR HODSON QC: But you yourself managed not to have genetically modified  
10 crops?

11

12 MR CHRISTISON: No, I have never knowingly planted a genetically  
13 modified crop.

14

15 MR HODSON QC: I don't want to overstate it, because it's your country,  
16 you know it much better than I ever will; the opportunity is there  
17 to try to achieve that, a farmer if he wants for any reason to  
18 avoid genetically modified organisms, can try to achieve GE-free  
19 crops?

20

21 MR CHRISTISON: Well, you see, where their crop land is continuous and  
22 you have the problem of contamination at that level, and then you  
23 have the problem of contamination at the elevator level, eventually  
24 the grain comes out of your own bins and has to go somewhere. And  
25 then you have the problem, the economic consequences of everybody  
26 losing, because as I stated in my testimony, the economists are  
27 saying all grain, all corn, whether it's GMO or whether it's not,  
28 taken at about 30 cents a bushel because of the contamination and  
29 the rejection by the consumers of the world.

30

31 MR HODSON QC: Let's be clear about that; is there a 30 cent premium for  
32 non-GM corn?

33

34 MR CHRISTISON: Well, you can say it either way; it means the same.

35

36 MR HODSON QC: So, in a given district in your area, how many of the  
37 farmers out of how many might achieve that particular premium?

38

39 MR CHRISTISON: We are not in an area where, that we can readily get  
40 that premium on soybeans, but we are on corn, if you happen to have  
41 the right hybrid number, it is non-GMO. But you know, we don't  
42 have a premium market - we do have, I mean, I can haul to Central  
43 Illinois but I would use up all of the premium in my trucking  
44 costs.

45

46 MR HODSON QC: The various crops you represent have, as well as your own  
47 coalitions you've described, industry associations if you like, do  
48 you know the American soybean association?

1  
2 MR CHRISTISON: I do.  
3  
4 MR HODSON QC: Are you a member of that, Mr Christison?  
5  
6 MR CHRISTISON: Part - no. Well, I guess I am a member in as much as  
7 the fact that I have to pay a check-off fee and they send me some  
8 publications, but I guess that really constitutes me being a  
9 member. But it's not by my choice; it's mandatory.  
10  
11 MR HODSON QC: I take it some of the publication is endorsed by  
12 technology?  
13  
14 MR CHRISTISON: It is, yes.  
15  
16 MR HODSON QC: Is it the same position with the National Association of  
17 Wheat Growers?  
18  
19 MR CHRISTISON: Yes, we have 24 different check-off commodity  
20 organisations in the US.  
21  
22 MR HODSON QC: And the wheat growers also are in favour of  
23 biotechnological research?  
24  
25 MR CHRISTISON: All commodity organisations are in favour of genetic  
26 engineering as far as I know.  
27  
28 BISHOP RANDERSON: Sorry, are we using those words interchangeably,  
29 genetic engineering and biotechnology?  
30  
31 MR HODSON QC: From the material I've got, I think Mr Christison and I  
32 are speaking the same language and he said genetic engineering.  
33  
34 BISHOP RANDERSON: So you are meaning biotech meaning GE and he replied  
35 in that?  
36  
37 MR HODSON QC: Yes.  
38  
39 BISHOP RANDERSON: Okay.  
40  
41 MR HODSON QC: What I have here, Mr Christison, so - and I have no idea  
42 if you're familiar with it, so I'll just tell the Commission what  
43 it is and then show it to you, it's one of a series of briefs from  
44 the International Service for the Acquisition of Agribiotech  
45 Applications, ISAAA for short. This particular one is entitled  
46 "rent creation and distribution for the first three years of  
47 planting BT cotton". Now, if we just hand that around.  
48

1 [Document distributed to presenters and Commission]

2

3

PRODUCED AS EXHIBIT H246

4

5

MR HODSON QC: For the Commission, the information about what the ISAAA works and where it operates is just inside on the page roman numerals II before you get to contents.

6

7

Are you familiar with the organisation, Mr Christison?

8

9

MR CHRISTISON: No. No, I'm not.

10

11

MR HODSON QC: Do you grow any cotton?

12

13

MR CHRISTISON: No. We are too far north to grow cotton.

14

15

16

MR HODSON QC: Well, I can't ask you to comment on it, I can only table it for what it's worth in the circumstance. The summary really deals with the percentage of what's called "rent creation as shared between the farmers and the innovators", and it makes the comment that Missouri, for some particular reason, I suspect it's to do with the climate, farmers didn't do nearly so well, there. Do you know anything of cotton farmers in Missouri?

17

18

MR CHRISTISON: We have a limited number of cotton farmers in the boot heel which is about 400 miles from where I live.

19

20

MR THOMAS: Members of the Commission could we just clarify who the ISAAA are?

21

22

MR HODSON QC: Have you had a look inside?

23

24

MR THOMAS: I wondered if it was possible to clarify whether it was an organisation funded by the biotech industry.

25

26

MR HODSON QC: I think that's right, and I think if you visit their website you will see that. I think you will be even more convinced with their next document. Perhaps if I can offer by way of contrast; I see one of yours comes from the Greenpeace Research Laboratories. Thank you very much, that's all I have for you.

27

28

Sir, I have some questions for Greenpeace generally in relation to the Via Campesina Commission, shall we do that at this stage or wait until a later stage in the afternoon?

29

30

CHAIR: I feel you could ask now.

31

32

MR HODSON QC: Thank you, sir. Yesterday we had the Soil Health

33

1 Association and a - we were discussing particularly with Professor  
2 Bosselmann the concept of sustainability, and with - that witness  
3 and his organisation. The general proposition put out was what  
4 they meant by sustainability could be summarised as maintaining a  
5 balance between the needs of the present and the interests of the  
6 future. Now, the Greenpeace submission is replete with sustainable  
7 development and sustainability. Could we have a definition,  
8 please, of what we actually mean by it?  
9

10 DR STABINSKY: Could I just make the point that I was at the  
11 presentation yesterday, and I believe that when all of the  
12 different individuals at the table were asked the definition, that  
13 in fact they didn't come up with one definition, that there wasn't  
14 one definition put forward for the Soil and Health Association.  
15

16 MR HODSON QC: We got five, I think; that was the starting point that I  
17 put up to them. Could Greenpeace take it in any other direction  
18 from that point or in any other way?  
19

20 MR THOMAS: I mean, Greenpeace's core values, if you like, is defence of  
21 nature, and certainly with respect to the question you ask, it's  
22 not - sustainability we would see as ensuring the ability of the  
23 earth to nurture life in all its diversity, and that's - that would  
24 be the way Greenpeace would look at it. And just to clarify, all  
25 that diversity includes human culture and all the diversities of  
26 human culture; just to clarify that.  
27

28 MR HODSON QC: Thank you. Given yesterday's experience does anyone wish  
29 to add to that one?  
30

31 [No comments from the panel]  
32

33 MR HODSON QC: Looking at the Greenpeace submission Form 1.  
34 Unfortunately my pages are not numbered, but going to A1 paragraph  
35 4, Greenpeace New Zealand believes that genetic engineering and its  
36 uses in agriculture are not compatible, as set out in about seven  
37 bullet points. Are you with me?  
38

39 MS COTTER: Yes.  
40

41 CHAIR: It's in a number of pages numbered 1 in our copy.  
42

43 MS COTTER: We have to apologise for that.  
44

45 MR HODSON QC: Now, I'll put up a proposition which I'd invite  
46 Greenpeace to comment on. That is that, Greenpeace approaches the  
47 subjects that we are debating starting with the values that  
48 Greenpeace has and then adapting, and I don't mean this

1 pejoratively at all, but seeking to have the science fit the  
2 values. Whereas, the other approach, which I think was very clear  
3 in the first few weeks of the Commission, was to start with the  
4 science, establish as best one could, what the facts are, and then  
5 look at that situation in the light of whatever values one happens  
6 to hold. In other words, there's quite a philosophical difference  
7 of approach. Do you start with the values or do you start with the  
8 science?  
9

10 DR STABINSKY: As a scientist, I would argue that in fact all of us  
11 approach every day of our lives with the values with which we hold  
12 really, that in fact it's an impossibility to say, I leave all my  
13 values aside when I walk into the laboratory, and when I open up  
14 the journal of science, that in fact I really don't think that  
15 that's an acceptable proposition, that in fact you're - as a  
16 scientist you objectively look at research. Without having any of  
17 your values with you at the time that you're doing that.  
18

19 MR HODSON QC: I have the impression that, for a good deal of the  
20 inquiries of this Commission, the two sides have been going past  
21 each other and I thought of that as one way to illustrate the  
22 point. Would Greenpeace like to comment on that, that the  
23 proposition seems to be that scientists who want to genetically  
24 modify can't really see past their idea of the science, whereas the  
25 wider issues, as the green side for want of a better word, includes  
26 values of a listed approach and all sorts of other considerations.  
27

28 DR STABINSKY: I'm really unclear as to what you're asking and maybe you  
29 could restate it in a different way.  
30

31 MR HODSON QC: If I'm not making myself clear it probably isn't worth  
32 it.  
33

34 Could we move on to paragraph A2 in brackets number (3), and  
35 that's, "Greenpeace New Zealand recommends full Government  
36 commitment to support and further ecologically appropriate  
37 production, including commitment to the provision of Aotearoa as  
38 fully organic by 2020". Now, that in essence I think would be the  
39 policy of the Green Party.  
40

41 MS COTTER: Organics 2020 is a vision that's held by a great deal of  
42 groups within New Zealand, for instance the Soil and Health  
43 Association, many of the organics groups and I understand that it's  
44 a vision that the Green Party supports as well. The point we're  
45 making here is that, with Government support into ecologically  
46 appropriate production, for instance organic agriculture, rather  
47 than into other areas of production, for instance, the enormous  
48 amount of resources going into research and development into

1 genetically engineered organisms, is a far more appropriate  
2 direction for research and development to go.

3

4 MR HODSON QC: The point that I was questioning was that, really, if you  
5 want the Government to do it, there has to be a political will, and  
6 I agree with you, there are many people outside of Government who  
7 are interested in it, but the Greenpeace does represent,  
8 regrettably or otherwise depending how you feel about them, about  
9 5% of the national will.

10

11 MS HOWARD: As Annette said, this is a vision not just endorsed by  
12 Greenpeace but by members of the Green Party, by the Soil and  
13 Health Association who is actually responsible for generating that  
14 position. So, I would say it is at least far more than the 5% that  
15 you regrettably or otherwise refer to.

16

17 MR THOMAS: Could I just ask where you get your 5% figure from?

18

19 MR HODSON QC: I thought that was roughly the level of support for the  
20 Green Party, but maybe I'm wrong.

21

22 MR THOMAS: You said "Greenpeace".

23

24 MR HODSON QC: No, the Green Party.

25

26 MR THOMAS: You see, Greenpeace is not affiliated, never, with any  
27 political party anywhere in the world, and we don't take any money  
28 from them.

29

30 MS COTTER: From industry or from political parties.

31

32 MR HODSON QC: Now, my point was that, if you want a Government  
33 commitment, you have to find a political will for that to happen,  
34 and I was looking for evidence that there was such a will.

35

36 MS COTTER: Well, I think that much of the evidence that has been  
37 presented before the Commission to date, for instance, by the week  
38 of organics groups presenting --

39

40 MR HODSON QC: Could you speak up a little bit so everyone can hear?

41

42 MS COTTER: Much of the evidence that has been presented before the  
43 Commission attests to the growing demand for organic produce, both  
44 within New Zealand and for export, so I think that there is a great  
45 will within the community to find support for the development of  
46 that market.

47

48 MR HODSON QC: I've got some material to discuss with relation to golden

1 rice, and a subject with which we've mined richly but not yet  
2 exhausted. Would you prefer that I did that with your next witness  
3 or at this stage?

4

5 MS COTTER: We'd appreciate that Anuradha Mittal gets the chance to  
6 answer those questions, if that's okay with the Commission as well.

7

8 MR THOMAS: Unless it's specifically around Greenpeace policy.

9

10 MR HODSON QC: There are two documents I have here, and we can circulate  
11 them for you in a minute. One of them is a statement from  
12 Greenpeace, which is I quote entitled "genetically engineered  
13 golden rice is fools gold", dated the 9th of February 2001  
14 attributed to Von Hernandez and Benedikt Haerlin, a Greenpeace GE  
15 examiner in the Philippines. And a response from Professor  
16 Potrykus of the next day, 10 February 2001; and from the response  
17 it would appear that quite a remarkable level of agreement has been  
18 reached.

19

20 Both sides deplore the extreme claims that have been made for  
21 golden rice. Professor Potrykus says that standard biosafety  
22 assessments are to be performed, these assessments can, however,  
23 only be done in connection with field release experiments and I am  
24 therefore happy that Greenpeace stated that they will not interfere  
25 with field release in proper testing. I understood that also  
26 Greenpeace does not see any immediate environmental risk which  
27 would justify to prevent field testing or destroy test fields of  
28 golden rice. Are you familiar with that statement?

29

30 MR THOMAS: Yes, I am familiar with the statement from Professor  
31 Potrykus. Can I also put something before the Commission.

32

33 [Document distributed]

34

35 If I could clarify for the Commission what this is about.

36

37 CHAIR: I think we're familiar with these documents.

38

39 MR THOMAS: But specifically the response from Professor Potrykus refers  
40 to a response from himself and Benedict Haelan who was the  
41 international co-ordinator for Greenpeace and was discussed last  
42 Friday at the Biodivision Conference. Hopefully you will see from  
43 the letter to editors there was a number of ways in which this was  
44 reported in the English press particularly.

45

46 CHAIR: I'm wrong in saying we've seen these before. We've seen other  
47 versions.

48

1 MR THOMAS: It's a kind of further development. And, specifically I  
2 think you will see in that letter to editors from Benedict Haelan  
3 is a bit of a clarification there, that Greenpeace is opposed to  
4 the release of GMOs into the environment, any GMOs and that  
5 includes the golden rice and that includes field testing. I just  
6 want to make sure that's very clear.

7  
8 MR HODSON QC: Sorry, I didn't catch the last bit.

9  
10 MR THOMAS: That includes field testing.

11  
12 MR HODSON QC: You're still opposed.

13  
14 MR THOMAS: Yes, very much so, in the open environment.

15  
16 MR HODSON QC: Do you want me to talk about patents after Professor  
17 King?

18  
19 MS COTTER: Yes please.

20  
21 MR HODSON QC: The StarLink situation. It was mentioned yesterday, I'd  
22 ask you to confirm whether or not you are aware; our understanding  
23 of it is that Aventis have acknowledged liability, put aside  
24 several millions of dollars or allocated some millions of dollars  
25 and dispensed with the services of those responsible. Is that the  
26 state of affairs?

27  
28 MR CHRISTISON: I can only speak from afar on this issue because the  
29 only reason that Aventis owe me is because of the 30 cents of loss  
30 I'm taking on the corn I produce because of the contamination  
31 around the world and the world price is lower.

32  
33 MR HODSON QC: Yes. I suppose I should ask you Mr Christison, so, are  
34 you going to sue Aventis or open negotiations with them?

35  
36 MR CHRISTISON: Pardon? I didn't hear you?

37  
38 MR HODSON QC: I said are you going to sue or open up negotiations with  
39 Aventis?

40  
41 MR CHRISTISON: We have already launched a lawsuit.

42  
43 DR STABINSKY: May I intervene? I mean the fact that there do exist  
44 lawsuits in the United States right now against Aventis I think is  
45 a clear indication that in fact Aventis has not fully - that people  
46 are not fully convinced that they will in fact completely  
47 compensate those people that have lost because of the StarLink  
48 problem. And in fact, I believe that the Attorney-General -

1 there's - one of the suits is actually Attorney-Generals of a  
2 number of States, a number of farm States that also don't believe  
3 that Aventis will necessarily pay out and, therefore, there are,  
4 you know, numerous pending lawsuits against the company?  
5

6 MR CHRISTISON: If I might intervene, the Attorney-General of the State  
7 of Missouri is not signing on to the agreement because he feels it  
8 is unfair to Missouri family farmers.  
9

10 MR HODSON QC: It sounds then it took a few law suits to convince  
11 Aventis that they better start being serious about it and start  
12 putting up some money and that's as far as the debate has presently  
13 got. Is just a point about what we've heard about an ability to  
14 ensure and so forth. That where a giant multinational that has  
15 done something like that, it is a body with the resources and  
16 ability to compensate in due course by whatever mechanism that's  
17 dealt on?  
18

19 MR CHRISTISON: Apparently at the time they lack the will to make a  
20 proper compensation.  
21

22 MR HODSON QC: It's taken a little while to get there, but at least  
23 they've got the money?  
24

25 MR CHRISTISON: Hopefully so.  
26

27 MR THOMAS: I mean certainly, obviously StarLink is one particular  
28 spectacular example of where Aventis has to a certain extent been  
29 forced to come to grip with compensation issues and you called it  
30 yourself the StarLink disaster, it's been very clear and in your  
31 face. I have been at meetings where farmers have been meeting  
32 around field trials, farmers have said "if there's any  
33 contamination with my crop will AgrEvo pay compensation if my crops  
34 are contaminated. And the AgrEvo have refused point-blank to  
35 answer that question. It's obviously the best way to ensure  
36 liability, is not to release it in the first place if companies are  
37 intent on releasing this, then I think there needs to be a more  
38 formal system depending on the goodwill of these companies.  
39

40 MR HODSON QC: I doubt that StarLink would ever report they would glibly  
41 do something that cost them the millions that this one has.  
42

43 MR CHRISTISON: If I could respond?  
44

45 MR HODSON QC: Please.  
46

47 MR CHRISTISON: This is not the first year that StarLink has been in the  
48 environment in the US, and there is - there has been estimations

1 that it will take four years to clear all the channels of the  
2 StarLink contamination, and you know, I would perceive that there  
3 would be considerable loss to family farmers in the United States  
4 while that process is going on.

5

6 MR HODSON QC: I think that comment, Mr Christison would tie in with the  
7 other suggestions we've had, that these crops do tend to die out  
8 after about five years.

9

10 DR STABINSKY: May I make an intervention on that point?

11

12 MR HODSON QC: Please.

13

14 DR STABINSKY: Because I think that you're referring to this, you're  
15 once again referring to the Nature paper that was tabled last week,  
16 that showed that in the UK four different genetically engineered  
17 crops didn't persist in the environment, and you have referred to  
18 it now with respect to corn. And in fact I don't think any  
19 reputable biologist would have expected corn to be able to persist  
20 in the UK environment. Nor would we expect corn to be able to  
21 persist in the US environment. That was not, you know, a shock to  
22 the scientific world.

23

24 One of the crops that you would expect to persist in the UK  
25 environment, oilseed rape, granted in the limited field study that  
26 they did, they didn't see persistence of that oilseed rape. But in  
27 fact we do have very clear evidence from Western Canada, perhaps  
28 not of the persistence of the initial introduced genetically  
29 engineered oilseed rape, but we have a persistence of those traits.

30

31 Now we have, through cross-pollination, and we've tabled an  
32 abstract from the Weed Society of America, through  
33 cross-pollination, clear establishment of herbicide resistant  
34 populations of weedy canola in Western Canada, populations that are  
35 resistant to three different types of weed killers. So that, in  
36 fact the information that came from the Nature article, while very  
37 interesting, was very limited in terms of the crops that were  
38 looked at, the environments that were looked at and those results  
39 are not globally extrapolatable.

40

41 MR HODSON QC: Surely, even more to the point, it's not corn. Are there  
42 any studies on the persistence of corn?

43

44 DR STABINSKY: My educated guess as a plant biologist is that, and I  
45 don't know all of the corn growing environments around the world,  
46 that corn is highly adapted, it takes a lot of intervention by  
47 humans in order to grow, and that the largest risk of persistence  
48 of a corn trait in the environment is with respect to Mexico, and

1 other places where corn is the centre of diversity. And, the  
2 problem there would not be the persistence of the corn plant  
3 per se, the transfer of those corn traits to wild and weedy  
4 relatives of corn.

5  
6 Now that said, there are other mechanisms by which a genetically  
7 engineered organism such as corn, that their traits could persist  
8 in the environment and that is true the process of horizontal gene  
9 transfer. So, while you don't have corn becoming a weed, you have  
10 the potential for a genetically engineered corn plant to transfer  
11 its engineered trait to other organisms in the environment.

12  
13 MR HODSON QC: I think we do understand, I'm sure we do by now, the  
14 concerns about risks, but my question was whether you can refer us  
15 to any paper on systems of corn.

16  
17 DR STABINSKY: No, not any particular paper.

18  
19 MR HODSON QC: The policy that Greenpeace is advocating for New Zealand  
20 is a ban on release of genetically modified organisations of the  
21 enzyme - "organisms". Now, Professor Traavik told us this morning  
22 that what we've got are the first generation and he made it clear,  
23 an opinion that what we've got a something pretty crude in  
24 scientific terms, and it comes from progress, it comes from  
25 developments, it comes from research, and we can hope for what may  
26 be called perhaps second generation, Mr Traavik may want to comment  
27 on this.

28  
29 Given all that's proposed about the deficiencies and risks and  
30 concerns about what we've got now, the chance of anyone passing the  
31 testing procedure in this country at least to release it must be  
32 considered on the case that the Greens' put up at least as remote.  
33 Shouldn't we forget about bans and get on with researching and  
34 developing something better?

35  
36 MS COTTER: Should we forget about bans?

37  
38 MR HODSON QC: Why ban it? It's not coming out, it's not going to pass  
39 the tests according to what you people are saying about it, so  
40 let's not pass laws, let's invent something better.

41  
42 DR STABINSKY: Well, don't you represent a number of companies that are  
43 in fact involved in the technology that are selling genetically  
44 engineered seeds globally?

45  
46 MR HODSON QC: The companies that I represent are companies that are  
47 doing that globally, but the purpose of this Commission is to  
48 resolve or regulate or recommend what's to happen in New Zealand,

1 and the companies I represent have been very clear that they  
2 support rigorous testing procedures, rigorous regulatory procedures  
3 and they're happy to go along with their progress under those  
4 procedures. Now, if Greenpeace is right, they're never going to  
5 get through them.

6  
7 MR THOMAS: Can I just clarify? You talked about the first and second  
8 generation and I think we need to clarify what that means. Just to  
9 begin with, I think Professor Traavik, you can expand on this, you  
10 saw genetic engineering as the first generation of molecular  
11 techniques, that's the set of techniques that are, quite rightly,  
12 grouped; that the second generation are other ways of breeding  
13 techniques or other molecular knowledge, and Greenpeace certainly  
14 has no problem with, for example, molecular assessed breeding where  
15 there is no intervention.

16  
17 So, therefore to move on from that, you would say, why have a ban  
18 since - it would be great to hear an undertaking from those who you  
19 represent that they will not be releasing any genetically  
20 engineered organisms into the environment including field trials,  
21 but I think because you're dealing here with something that's  
22 potentially a major threat to New Zealand, given the importance of  
23 biodiversity here, there needs to be some sense in which that's  
24 enforced. That's what's potentially a pest if you like, is kept  
25 out.

26  
27 MR HODSON QC: Well, as I understood it, it's what our regulatory  
28 agencies are for, but I would be happy for Professor Traavik to  
29 talk about it. Before he spoke I would say he was the expert.

30  
31 PROFESSOR TRAAVIK: I am not the expert, as I said. What I am trying to  
32 be very very clear about, is that for the moment we have three  
33 generations of products coming to the marketplace, already on the  
34 marketplace; the first generation was what we know all about, the  
35 BT toxin transgenes, the Roundup Ready, made purely for agronomic  
36 reasons. Having no consumer benefits, having no nutritional other  
37 benefits, not even the producers have claimed that.

38  
39 Now then, you have the next generation of products which is  
40 exemplified by the very unfortunate Flavr Savr long storage tomato  
41 which have been transgenically changed for processing purposes  
42 mostly, and now then we have the third generation which may include  
43 also health and nutritional benefits as such.

44  
45 But, all these three generations have been made by the same crude  
46 and potentially inherently unsafe kind of methods, so they have  
47 been made by the first generation of genetic engineering  
48 techniques.

1

2 And, all the general unproved, unproved health and environmental  
3 risks apply to them all, whatever their purposes. So then, the  
4 question I heard was, and I do agree with you is, why do we go on  
5 like religious societies to discuss, why don't we go back to the  
6 laboratories and try to do something? Now, then my point is; if we  
7 do what we want to do under contained conditions, which is fully  
8 possible, then we should do it. But, all that's got to do with  
9 field trials is by definition release. And I have to point out  
10 again that we're not talking about chemicals here.

11

12 Now, one event of genetic transfer, be it by cross-pollination or  
13 be it by horizontal gene transfer, which is real, but we don't know  
14 a lot about it, may, by its own virtue, become a big pollution,  
15 that's the difference between chemical and genetic pollution.

16

17 So, it's impossible to make really contained field trials. Again,  
18 all that this calls for, to me, is to send us back to the  
19 laboratories and try to work out good ecological model systems to  
20 study really systematically biosafe issues. Was that kind of an  
21 answer?

22

23 MR HODSON QC: That was so helpful Mr Traavik, I'll now pass over to  
24 Mr Upton who must be champing at the bit.

25

26

27

\*\*\*

28

29

[2.45pm]

30

31 MR UPTON: I'm just sitting here. Can I just pick up a topic that was  
32 discussed this morning about the issue of containment and the  
33 proposition that Greenpeace campaigns on the basis of environmental  
34 issues, not containment uses? Could you, just so that we know  
35 precisely what we're talking about, look at the issue of  
36 containment we're talking about laboratory containment? The answer  
37 is, yes. Can we take it a stage further; are we talking about any  
38 particular level of laboratory containment? Are we talking about  
39 Level 4 or Level 3 or 2 or 1 or what?

39

40 DR STABINSKY: We're talking about a strict level of laboratory  
41 containment. That is, preventing all potential releases into the  
42 environment from laboratories.

43

44

45 MR UPTON: So, we're not looking at, in this discussion, at the specific  
46 level?

46

47

48 DR STABINSKY: No.

48

1 MR UPTON: As long as it's strict?

2

3 DR STABINSKY: Uh-huh.

4

5 MR UPTON: What about trials that are carried on, for example, in a  
6 greenhouse? What would you say about that?

7

8 DR STABINSKY: Greenhouse trials are problematic, that containment is  
9 very difficult within a greenhouse and as Professor Traavik has  
10 mentioned, Norway considers that greenhouses are actually releases  
11 into the environment. Greenpeace's position against the release  
12 into the environment of genetically engineered organisms would mean  
13 that we would - we would need a greenhouse that was very carefully  
14 sealed and proper disposal methods both of the soil and of the  
15 plant to be ensured in order to consider greenhouse trials  
16 containment.

17

18 DR ALLAN: So, Dr Stabinsky just to be sure you're talking about  
19 self-contained air and water and waste disposal systems, so you're  
20 talking about at least Level 3 containment?

21

22 DR STABINSKY: I'm not familiar with biosafety levels, in particular  
23 biosafety levels; so Level 3, level 4 doesn't have a lot of meaning  
24 to me. But, yes, a sealed greenhouse so that there's no chance for  
25 the escape of a - plant parts that would lead to the transfer of  
26 genes into the environment. So, pollen, soil, plant parts, you  
27 know all of that, there would have to be a contained system. Now,  
28 that does not necessarily mean recirculated air and water etc, but  
29 it does mean a very strict level of containment.

30

31 MR UPTON: Thank you. Just moving to another general topic for a  
32 moment. We're aware, of course, of the voluntary moratorium in  
33 Europe on GMO crop approvals. Has the panel heard of New Zealand  
34 over recent days, that that moratorium's been lifted?

35

36 MR THOMAS: My latest understanding, that I must admit I'm been somewhat  
37 taken up with preparing for today - my latest understanding is that  
38 there is some countries still holding out on that moratorium  
39 because in fact there's deficiencies, in particular I think  
40 labelling of animal feed and concerns about liability and so forth.  
41 France is one, I can't remember the others.

42

43 DR STABINSKY: Italy and another one.

44

45 MR UPTON: Am I correct in saying that there is a move by the EU towards  
46 lifting the moratorium, but France in particular is holding out on  
47 the basis of wanting further precautionary steps?

48

1 DR STABINSKY: My understanding is that this was a move by the  
2 Commission, which is only one part of the EU, and the Commission  
3 said that, since 1920 the law has been - the directive has been  
4 finalised that it does not want to wait until rules are actually in  
5 place in each of the Member States, and that the Member States, at  
6 least some of the Member States, are not in agreement with this  
7 position of the Commission. So, I wouldn't say the EU has decided  
8 this, it's really just a portion of the political part of the EU.  
9

10 MR UPTON: It's part of the process?

11

12 DR STABINSKY: Uh-huh.

13

14 MR UPTON: We probably can't take that one any further for the moment.  
15 Can I move then please back to Mr Christison. Your farm, of  
16 course, is mixed organic and conventional farming. Correct?

17

18 MR CHRISTISON: Yes. We have a very small organic part of our farm.  
19

20 MR UPTON: Yes, and you grow different crops, you've got wheat, you've  
21 got corn and you've got soy?

22

23 MR CHRISTISON: Yes, along with a herd of cattle.

24

25 MR UPTON: Yep, thank you. Do you practice a rotational type of  
26 programme when you're growing your crops?

27

28 MR CHRISTISON: We - it's impossible for us to observe a proper rotation  
29 because of the economics involved with what it costs to produce  
30 corn, and I lose less money when I produce soybeans, and so, we  
31 raise predominantly soybeans.

32

33 MR UPTON: Have you ever used Roundup at all?

34

35 MR CHRISTISON: Never on my own land. I have had a piece of land that  
36 was rented about 15 acres on very fertile soil that had a  
37 tremendous growth of grass and weeds that I was going to put into  
38 cultivation for the person that owned it, and I sprayed Roundup on  
39 it twice and it didn't kill the grass.

40

41 MR UPTON: Do you - just showing my ignorance of the farming process, do  
42 you actually need to clean up your ground at the end of any  
43 particular season when you're finished your cropping? Do you need  
44 to clean it to get ready for the next season?

45

46 MR CHRISTISON: You mean, destroy the residue?

47

48 MR UPTON: Yes.

1

2 MR CHRISTISON: Well, we do conventional type farming, our land is,  
3 where we produce crops, is flat and we do minimum tillage on it and  
4 yes, we do away with the residue.

5

6 MR UPTON: But if you have corn, for example, how do you get rid of the  
7 stubble in the ground after you've harvested the corn?

8

9 MR CHRISTISON: We disk the land with a disk and then recultivate it  
10 and it forms a mulch in the soil.

11

12 MR UPTON: Sure. Do you need to apply any sort of - I'm just thinking  
13 of any sort of spray to finish cleaning it off, or don't you do  
14 that?

15

16 MR CHRISTISON: No, not at all. And you know, the way that we form, we  
17 do minimum tillage in the spraying, we do not spray the weeds  
18 before we plant, we do not do no till at all. And then, after the  
19 crop comes up along with some weeds and that's dependent upon a  
20 number of different situations, then we use conventional spray on  
21 the part of the farm that's not organic.

22

23 MR UPTON: So you are using sprays on the weeds in the part that's not  
24 organic?

25

26 MR CHRISTISON: Yes.

27

28 MR UPTON: And if you don't use a Roundup spray, what would you use?

29

30 MR CHRISTISON: Oh, there's a host of different chemicals, and what we  
31 do is to go out in the fields and walk them, see exactly what the  
32 weeds are that came up, and then we select a sort of a cocktail of  
33 chemicals that we combine together for --

34

35 MR UPTON QC: And it's selective sprays for a particular weed?

36

37 MR CHRISTISON: Very selective sprays and, you know, we have to be very  
38 careful how we do that. We usually mix up 12 ounces per acre but,  
39 you know, the herbicides is the same as medicine that a person  
40 might take and, you know, too much will actually kill the plant  
41 with conventional chemicals, unlike Roundup.

42

43 MR UPTON: And you've explained to us that because of the natural  
44 barriers around your farm, that you don't have any - there's no  
45 particular risk of contamination from the next door neighbour's  
46 property?

47

48 MR CHRISTISON: Well, well, that pertains to our organic acres. Now, we

1 do have farmers that plant up against us on our conventional seeds,  
2 and where I - I think a point I should make is, where I produce my  
3 seed crop, and, you know, I have never produced a crop and I've  
4 been farming a long time, that was not from saved seed primarily.  
5

6 What I do is to get the very finest conventional seeds that I can  
7 with the best assurance that they are non-genetically engineered,  
8 and I plant that in a protected area, and I treat those seeds  
9 different, and I save that seed, I clean that seed the next year  
10 and the result of that is, is that I can - my seed cost per acre is  
11 - well, just recent - in a recent year my seed cost was \$6.51 an  
12 acre as opposed to \$42 if I had been planting the same number of  
13 pounds of a genetically engineered seed.  
14

15 MR UPTON: Is your prevailing wind a westerly?  
16

17 MR CHRISTISON: Well, I think probably it's more easterly.  
18

19 MR UPTON: Yeah. Do you find that you get a pollen drift from the  
20 up-wind farmer on your boundary?  
21

22 MR CHRISTISON: That is - that will absolutely happen.  
23

24 MR UPTON: Yeah, it's part of life, isn't it?  
25

26 MR CHRISTISON: It is a part of life, but the saving grace in our  
27 situation is that, there is not so much corn produced and soybean  
28 drift is much less.  
29

30 MR UPTON: Can I then move to another topic altogether, and it's perhaps  
31 one that, if I address to Professor Traavik. You mentioned earlier  
32 on today about, and I'm paraphrasing, trusting scientists, and you  
33 mentioned a figure of 95% versus 5%, saying at the same time that  
34 you did not have actual figures. Are you talking about Norway in  
35 that example, or are you talking about some other country?  
36

37 PROFESSOR TRAAVIK: I am talking about the whole world. But, as I said,  
38 those are not exact figures, I don't have any figures. But, if you  
39 start looking around at links, financial, economic, granting links  
40 between scientist's labs and economic interests, it is very very  
41 very common, and there are very very few scientists asked at all  
42 level that haven't taken any industry money at all. That is for  
43 sure.  
44

45 MR UPTON: You see, in New Zealand we have a very small group of  
46 scientists to start with, and most of the scientists that we have  
47 here work either for Crown groups or Crown entities, or for  
48 universities. We don't have the numbers here that work for private

1 corporations.

2

3 PROFESSOR TRAAVIK: In principle we have that situation in Norway too,  
4 with free institutes or institutes within the university campuses  
5 that are mainly provided for by public funding. But, I mean,  
6 public funding has been very meagre in most western countries in  
7 this area. So, many scientists are forced to seeking money where  
8 they can find it. But, of course, there is no money to get without  
9 some kind of strings attached and, after all, we are human and we  
10 feel loyalty and we don't bite the hands that feed us.

11

12 MR UPTON: Thank you. Can I move on then to another topic that we were  
13 looking at earlier, and that's the first generation technology that  
14 you were discussing before lunch. Can we look forward to the  
15 second generation technology? Are you able to predict what that's  
16 going to provide? Can you give us any idea of what that's going to  
17 be able to achieve? Is it going to be much more specific much more  
18 focused, less - I'm sorry, I'll rephrase it; more predictable?

19

20 PROFESSOR TRAAVIK: If I understood in fact there were two questions one  
21 what we may anticipate of products and applications, and two, what  
22 kind of technologies we're talking about? Was that correct?

23

24 MR UPTON: Uh-huh.

25

26 PROFESSOR TRAAVIK: Yeah. If we take the first issue; as I said, as a  
27 result of the genome sequencing projects we have become aware that  
28 there are a lot of genes in common between all creatures on earth,  
29 only one of the differences between species is what kind of genes  
30 that are expressed at any given time. Now some of the genes that  
31 aren't expressed in a banana, for instance, are very like some  
32 proteins that already have medical interest or that we may - it may  
33 have biomedical effects that we want. So, if we are able safely,  
34 from all points of view, to evade these sleeping genes in all the  
35 creatures, then we may do this under contained conditions, only  
36 take out the products of the invoking genes, and use that. That is  
37 one obvious strategy.

38

39 The other strategy is to, in already existing genes where we see  
40 that the sequence is very much like, but not identical, to the gene  
41 for a given interest in product, we can in situ in the plant or in  
42 the cell culture, change, by molecular methods, that particular  
43 gene so that it gets a new wanted effect. Preferentially then, in  
44 edition to the effects it already have, because we wouldn't like to  
45 delete a necessary function.

46

47 But both these strategies will from some points of view be  
48 inherently more safe than the first generation of genetic

1 engineering. And that goes to the destabilisation of the whole  
2 genome that you get when you integrate something. In short, the  
3 whole transgenic technique.

4  
5 And the other important thing is that, when you insert  
6 contra-elements like a promoter into an established genome, a  
7 promoter is not constantly turning genes on or off, a promoter is  
8 functioning according to signals coming from the environment around  
9 and from things coming from inside the organism, and simply  
10 converting them into the exact and very very finely tuned level of  
11 expression that you want to do. Now, this has been developed by  
12 nature through the whole evolutionary history. When you come in  
13 and put a new promoter, you perform a totally unpredictable leap in  
14 evolution because that promoter will take over and make both - give  
15 over-expression and under-expression and even silencing of some of  
16 the genes that are already there and who work together.

17  
18 DR FLEMING: Professor Traavik, can I just extend this a little? Go  
19 back to the sleeping genes. How are you going to switch on, for  
20 example, a gene that you want expressed in some way in a banana,  
21 without somehow modifying or manipulating, or whatever language you  
22 like to use, the control elements?

23  
24 PROFESSOR TRAAVIK: I think I can explain that, because as we get,  
25 already have, the sequences of a large number of genes, we  
26 automatically also have the sequences of a large number of  
27 promoters. And from the sequences of promoters we may deduce what  
28 kind of influence, what kind of transcription factors is turning on  
29 and turning off that gene, and they may activate a given zeno  
30 system chemically in order to have that gene effect.

31  
32 DR FLEMING: Thank you.

33  
34 PROFESSOR TRAAVIK: If I might add, that is not as simple as without  
35 risks as its own naturally.

36  
37 DR FLEMING: You're telling me.

38  
39 PROFESSOR TRAAVIK: Because it's very different to turn on one specific  
40 signal without turning on others, but this is something that the  
41 university is already working on, we know that.

42  
43 DR ALLAN: There has been criticism of the cauliflower mosaic virus 35S  
44 promoter, and we've heard already from Dr Mae-Wan Ho there are - by  
45 video link; there's been some concern about alternative promoters  
46 to that. Have you got comments on that?

47  
48 PROFESSOR TRAAVIK: You see, the problem with plant promoters are two

1 the way I see it; one is that gene expression control in plants in  
2 itself is a scientific orphan, there's very little known so far  
3 about the final details of gene expression control in plants. And  
4 the other thing is; and the other thing is, when the plant  
5 promoters get into the consuming organism, there's very little  
6 known about how a plant promoter works in a human being, for  
7 instance.

8  
9 Now, this is quite confusing to me because there's a lot of data  
10 that haven't been used. I'm very interested in doing experiments  
11 with the 35S promoter in mammalian cells, but it was claimed all  
12 the time that it didn't function. But if you look at the sequence,  
13 I could even, without using a computer, recognise a lot of  
14 mammalian transcription factor binding motives within it. Now that  
15 the motives are there there's automatic functions, but it's funny  
16 to me that all these good guys with their computers and everything  
17 haven't already looked at this and done studies on this many years  
18 ago before they started to use the 35S.

19  
20 DR ALLAN: What about the viral sequences that are copied many times in  
21 human genome and other animal genomes and plant genomes?

22  
23 PROFESSOR TRAAVIK: That's a very interesting question, of course. And  
24 it's so complicated that I nearly said - as a hesitation, I'm happy  
25 you asked me that, but before I said that I have to say something  
26 else. I say that you have to look at viruses too, retroviruses,  
27 for instance, as a continuous flow into any genome.

28  
29 Now, those individuals which have inserted until the wrong places  
30 in the genome will be out of revolution. So there are those of us  
31 who have been able to handle this and silence these genes that are  
32 the happy ones who are here to spread our genes still. Deep  
33 inserted genes from retrovirus, for instance, are silenced mostly.

34  
35 But, it has for instance been shown in mammalian cells that by  
36 simply inserting a transgene you may activate normally sleeping  
37 retrotransposons. And that's one of my worst nightmares, because  
38 most people think about horizontal gene transfer in terms of  
39 transfer of the transgene, which is a possibility. But to activate  
40 a number of promiscuous jumping genes that is to me a much worse  
41 alternative, and we know very little about the mechanisms for that.  
42 But we do know that by insertion you may do that sometimes.

43  
44 DR ALLAN: Thank you.

45  
46 MR UPTON: But we are moving forward, aren't we, to much more specific  
47 techniques in terms of gene expression? Are you aware, for  
48 example, of genes being expressed only at a certain stage of

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1 development? For example, at maturity?

2

3 PROFESSOR TRAAVIK: See, I'm very well aware of that, but --

4

5 MR UPTON QC: Could you talk to us about - and that is now a reality,  
6 isn't it, that you can turn on and off with the aid of a drug when  
7 an organism reaches maturity?

8

9 PROFESSOR TRAAVIK: See, that is the theory.

10

11 MR UPTON: Is it the practice yet?

12

13 PROFESSOR TRAAVIK: It is practice, but it doesn't function all the  
14 time. So, depending on the exact and what - there is no such thing  
15 as a faithful promoter.

16

17 MR UPTON: But we're getting there, are we?

18

19 PROFESSOR TRAAVIK: Hopefully, but because it's not faithful and because  
20 you might have expression and replication at the wrong place at the  
21 wrong time, this kind of experiments too should be kept totally  
22 contained.

23

24 MR UPTON: Is it going to be achievable? Are we going to get there? Or  
25 is it always going to be a dream or a theory?

26

27 PROFESSOR TRAAVIK: My best guess is that that is not the best strategy  
28 of the current state that we have. I think the two I mentioned are  
29 better.

30

31 MR UPTON: Thank you very much, that completes my questioning. Thank  
32 you, sir.

33

34

35

\*\*\*

36

37

[3.11pm]

38

39 DR FLEMING: Yes, I'd like to go a little bit further with the selective  
40 expression and no doubt you've heard of experiments to express a  
41 gene selectively in the chloroplast or the mitochondria, would you  
42 like to make a comment, in the light of that discussion about  
43 systems that express a gene at a particular time, and talk a little  
44 about the expression of genes at a particular place, if you like.

44

45 PROFESSOR TRAAVIK: The strategies to have transgenes, or any genes,  
46 expressed during one stage or to have it expressed in just some  
47 predetermined parts of the animal or the plant has been a dream for  
48 a long time. And a lot of people have worked on that, and you can

1 achieve that under varied conditions, but once you put these  
2 creatures under other conditions which may be much more realistic  
3 in authentic terms than the selected lab conditions, you have - you  
4 always see a problem with keeping up the selectivity.

5

6 DR FLEMING: Okay.

7

8 DR ALLAN: I have another area of questions really in virology,  
9 Professor Traavik, and it's to do with the fact that there are some  
10 less than commercial crops already GM'd for virus resistance, and  
11 I'm thinking here of papaya in Hawaii and cassava and some of the  
12 Third World crops, do you see risks in this in terms of GM?

13

14 PROFESSOR TRAAVIK: There are definite risks, and I would like to say  
15 some few words about that. Now, when you immunise a plant by  
16 putting in a gene from a virus, that is a brilliant idea, was a  
17 brilliant idea. Now, it turns out pretty soon already in 94 Green  
18 Alison published an article showing for a specific virus pest, that  
19 when you superinfected plants that had a transgenic virus plant -  
20 virus gene already, with the donor virus or a close relative, you  
21 might have recombination, new viruses popping up between the  
22 incoming virus and the sequence in - the transgenic sequence. And  
23 these viruses might have totally unpredictable characteristics in  
24 terms of pathogenicity and so on and so forth. That was proven  
25 already in 94 for one specific virus.

26

27 To this extent, this is general; nobody knows. Because it's been -  
28 at least there is a very statistic number of peer reviewed  
29 publications in this field. The reason I am interested in this  
30 field is that the Green Alison view shows the value of the  
31 Precautionary Principle as a judging rule also for science because  
32 what they did was that they showed later on in work published in 96  
33 that by trimming they - they had identified a risk, right they did  
34 it, and by trimming the insert, the viral gene insert in a certain  
35 way, they could eliminate the possibilities of having new  
36 recombinant viruses popping up.

37

38 DR ALLAN: But aren't they popping up all the time, new recombinant  
39 viruses? I deal with flu every winter.

40

41 PROFESSOR TRAAVIK: That is absolutely right. But see, there are rules  
42 for the flu, as you know. The new flu strains, influenza A  
43 strains, are popping up either four or five years or 11 years,  
44 actually 11, 13 years you have an epidemic. But these are not  
45 recombinants, they are reassortants, so they have fragmented viral  
46 genomes and they are able to select from different animal species  
47 and make a new virus, but it's not new species as such, it's only  
48 that your immune system does not recognise fully the new strain.

1

2 What I'm talking about now is recombination which have - which may  
3 have total differences in whose preferences which give disease, a  
4 pathological changes that none of the donor viruses had. This is a  
5 field that we are working in for the moment because, as you may  
6 know, pox virus is one of the most important and interesting  
7 vectors for vaccines. We have shown recently, not published yet,  
8 but that's why I sketch what we've done. Now, if you take a pox  
9 virus vaccine with an influenza insert for instance, and you inject  
10 it on humans or free ranging animals, or even wildlife which has  
11 been proposed and even done, then that is a release unless you put  
12 these individuals on under strict quarantine that, is a release.

13

14 If you have naturally occurring relative viruses in the wildlife  
15 around you, then at some stage you will have the situation where an  
16 individual is infected with the vaccine virus and a closely related  
17 naturally occurring virus at the same time.

18

19 DR ALLAN: We have that situation already when we're thinking of polio  
20 virus and similar other viral immunisations.

21

22 PROFESSOR TRAAVIK: No, I'm not - you see polio virus seemed to so far  
23 be a lucky case because that's only got one natural host species.  
24 But pox viruses are very promiscuous, each of them, although they  
25 come from one specific species they may infect others.

26

27 So, my point is, we thought about this situation, theoretically,  
28 what if - I mean, that's the precautionary approach, what if one  
29 individual is infected with a recombinant vaccine virus and a  
30 naturally occurring virus at the same time? Is it impossible that  
31 we get new recombinant variations, new recombinant viruses popping  
32 up, and what will they be?

33

34 So, we went out in the wildlife and we found Norwegian related  
35 viruses and we made these infections and we have recombinants that  
36 are totally different in some phenotypic respects from any of the  
37 parental viruses.

38

39 DR ALLAN: Are they pathogenic?

40

41 PROFESSOR TRAAVIK: Path --

42

43 DR ALLAN: New viruses, do they cause disease?

44

45 PROFESSOR TRAAVIK: So far we have made the double infections, and for  
46 the moment we're characterising then phenotypically and  
47 genetically. We have to put them back into animals, to answer your  
48 question, and that's the next step.

1

2

DR ALLAN: But what about the argument that the crop that has a virus in it, you know, rusts and other things, those plants have already got many other viruses there too naturally.

5

6

DR STABINSKY: Tepfer et al a number of years ago wrote an article, and I don't have it with me.

8

9

DR ALLAN: We heard from Dr Tepfer.

10

11

DR STABINSKY: A general review article about some of the plants that are transgenic with viral proteins in particular, but some of the other viral elements as well. One of the things - I mean, the short answer is, there's a lot that we don't know. One of the hypotheses is that in plants you may have double infections or triple infections. Obviously plants can have many viruses, but that those are not necessarily contemporaneous in the same cell, right.

19

20

And while viral recombination is certainly very common, that in fact genetically engineered plants allow contemporaneously co-infection within the same cell. And I think people have done research to show that in different parts of the plants you find one virus and not another virus even when you have a co-infection. But certainly with genetically engineered plants, with transgenic virus resistant plants you've always got that transgene from the virus expressing in every cell, and then you have much more of a potential for co-infection within a cell and recombination within the cell.

30

31

DR ALLAN: I'll leave it, thanks.

32

33

DR FLEMING: This is a simple one, I didn't want to break the flow. Does Greenpeace - we've been talking about plants here and we've been talking about containment, and I want to stick to the issue of containment and not ethics or anything else. Does Greenpeace have any policy as to the containment of genetically modified animals; as to recommendations or anything like that?

39

40

DR STABINSKY: Greenpeace looks at genetically engineered animals, and you know, what we look at is, what are the means by which the genetically engineered animal or some part of it, the transgene can be released into the environment, or impacts of those - the genetic engineering event itself. So, if you look at, for instance, animals that have been genetically engineered to produce pharmaceuticals, some of the concerns, the environmental concerns that Greenpeace would express relevant to containment would be, you know, containment of the animal itself, containment of the

48

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1 excrement, the faeces and the urine of the animal so that there's  
2 no route for transfer into the environment of the transgene or that  
3 recombinant protein because in fact that recombinant protein could  
4 have significant environmental impacts as well. So those are the  
5 types of things we would look at.

6  
7 Now we understand that there are also animal welfare issues that  
8 are of concern to many of our members, but you know, so I will  
9 raise those broader concerns specifically with respect to  
10 containment, you know, I've looked at field trial applications for  
11 the pharmaceutical animals here in New Zealand and those I don't  
12 consider containment, there's potential for burying of the animals  
13 on site and there's potential for obviously the transfer of that  
14 DNA into the environment. And there seems to be no provisions at  
15 all for the excrement, you know faeces urine for containment of  
16 that and that appears to me to be going into the environment, into  
17 the water supply etc.

18  
19 CHAIR: We'll take the afternoon break for 15 minutes.

20  
21  
22 Adjournment taken from 3.20pm to 3.35pm

23  
24  
25 [Teleconference call to New Delhi established]

26  
27 MR CURRIE: Professor Traavik will be back in a minute, I think he went  
28 outside, sir.

29  
30 CHAIR: We're waiting for Dr Mittal at the moment.

31  
32 MS COTTER: Okay, Anuradha, it's all yours. You can start your  
33 presentation now.

34  
35 \*\*\*

36  
37 [3.35pm]

38 MS MITTAL: Well, I first of all want to thank everyone for making this  
39 happen that I can still testify on behalf of Greenpeace. I'm  
40 Co-director of Food First, the Institute for Food and Development  
41 Policy, our US based policy think tank which has been called by the  
42 New York Times, as one of the country's most established food think  
43 tanks.

44  
45 I want to establish first about Food First which will explain where  
46 I'm coming from. Our mission is to inform people to take action  
47 that causes injustices that cause devastation and hunger throughout  
48 the world, and we do this through research, through analysis,

1 education, and advocacy about the underlying causes of hunger, and  
2 to also suggest emasculating and new ways to address the problem of  
3 hunger.  
4

5 We are a 25 year old institute which was founded by Francis  
6 Mualafei(?) following the Census of Diets for a Small Planet, our  
7 best seller book, and today we have a distinguished and  
8 internationally recognised record of progressive leadership on  
9 global food, hunger and agricultural issues.

10  
11 The unique thing about Food First is that we stand out for a  
12 consistently uncompromising, progressive stance on issues of  
13 hunger, and we're the only such organisation in the US to obtain  
14 more than half of our funding from individual member contributions.  
15 We do not accept any corporate funding, any Government funding, so  
16 that we can represent the views of the people. We publish books,  
17 backgrounders, policy briefs, development reports, which are used  
18 in over 400 US universities, and our books have been translated in  
19 over 22 languages worldwide, and several organisations both in the  
20 north and the south, focus on the north and south and Thailand said  
21 they were inspired, or they were started as projects by Food First.  
22

23 MS COTTER: Anuradha, sorry to interrupt. We have a stenographer here,  
24 so if you wouldn't mind talking a little bit slower, then she can  
25 keep up.  
26

27 MS MITTAL: Okay, sorry about that. The question that might come up in  
28 your mind is that, who do we work with? Well, the institute aims  
29 to build and promote emasculating, one that would connect the  
30 international communities and the American people with a sense of  
31 shared human values. So, we work in correlation; for example, we  
32 have a campaign Economic Human Rights, The Time Has Come, it's  
33 endorsed by over 250 groups across the United States and these  
34 range from community based groups, grassroots groups, to farm  
35 labour groups, to trade unions, to groups working on immigrant  
36 rights, women's rights, trade based groups. So, we work with a  
37 whole diversity of groups both international and nationally, and  
38 this internationalism is a driving force and provides us with the  
39 people's mandate.  
40

41 I want to move on to the next important aspect of our work. Over  
42 the last 25 years we have been - the most important research that  
43 we have done has been to denounce that hunger is caused by shortage  
44 of food production. Research over the 25 years shows that why  
45 today 800 million people do not have enough to eat and that number  
46 is likely to increase to 1.5 billion people in the next 10 years.  
47

48 Right now I'm speaking from India where we're looking at the

1 newspapers or talking to the Ministry officials; they keep saying  
2 that genetic engineering is the solution to end hunger. So, I do  
3 know during the proceedings of the Royal Commission several  
4 promoters of biotechnology have mentioned it only as one of the  
5 many tools and not the tool, but it is a very different story in  
6 India where I am based right now.

7  
8 However, our research shows that abundance and not scarcity best  
9 describes the World's food supply; enough wheat, enough rice and  
10 other food grains are produced to provide over 3,500 calories a day  
11 per person, and it does not even count the most commonly eaten  
12 fruits, vegetables, beans, nuts, root crops, and in fact enough  
13 food is produced to provide 4.3 pounds of food per person per day.  
14 So, the problem is not of production, it is clearly of access and  
15 distribution.

16  
17 And, I mention these facts because over and over again during my  
18 stay in India I have found out, by talking to the Ministry  
19 officials, or speaking to scientists, or looking at the media  
20 reports, genetic engineering will solve the problem of India.

21  
22 Now, 73% of countries which are reporting child malnutrition are  
23 actually food exporting countries, and India is a classic example  
24 to look at. It ranks among the top Third World country  
25 agricultural exporters, yet a third, almost 300 million people of  
26 those 800 million hungry people live in India. So, if we actually  
27 make a change in hunger issues in India we would have alleviated  
28 the problem at a global scale.

29  
30 However, what we find in India is that year after year this country  
31 has managed a surplus. In 1999 India produced a surplus of  
32 10 million tonnes of wheat. Now, instead of distributing that food  
33 to 300 million people, the Government decided to export it or allow  
34 it to rot.

35  
36 Last year India, once again, had an unmanageable food surplus, and  
37 from 10 million tonnes it had an excess of 44 million tonnes of  
38 food grain; and, once again, instead of releasing this food to  
39 hungry people through food stamps, through our ration shops,  
40 through the public distribution system, this food has been exported  
41 and dumped in other Third World countries. And that remains a big  
42 problem and this is something that we do need to confront, because  
43 it is an excuse that has been used by the Indian Government instead  
44 of fulfilling its constitutional responsibility of fulfilling the  
45 right to be able to feed its own people.

46  
47 The other big debate which is raging in India right now is around  
48 Vitamin A rice. In fact, very recently a delegation of US judges

1 came and met with the Chief Justice of India to actually impress  
2 upon to the judicial fraternity the benefits of biotechnology. So  
3 here we find it's not just academia but also the judiciary who has  
4 been fooled into the Vitamin A rights benefits. But I want to talk  
5 a little bit more on Vitamin A rights.

6  
7 First of all, millions of dollars have already been spent over  
8 decades to produce this transgenic rice, Vitamin A rice, and it  
9 will take millions more and another decade of development before  
10 this variety is ready to be planted in farmers fields.

11  
12 Secondly, we're very concerned that Vitamin A rice will further  
13 deepen the genetic reductionism of the Green Revolution. A country  
14 like India, which had over 50,000 varieties of rice, instead of  
15 farmers planting and breeding and growing different varieties of  
16 rice which would adapt to diverse ecosystems and food systems. The  
17 Green Revolution and now the genetic engineering will reduce the  
18 agriculture to few varieties of few crops.

19  
20 Also, this solution of Vitamin A rice for ending night blindness is  
21 based on blindness to other emasculating. For example, there's  
22 some very cheap accessible emasculating such as improving people's  
23 diets; eggs, milk, liver, even beta carotene is also found in green  
24 leafy vegetables; mangos, papayas; it's a much more inexpensive  
25 solution. Also, UNICEF has a programme in 70 countries where  
26 threat of mortality is high and immediate intervention is necessary  
27 to provide Vitamin A pills, and it does not cost more than 2 to 4  
28 cents a year.

29  
30 The other important issue I want to touch upon is one of diversity.  
31 A country like India has the red rice; brown rice already has  
32 Vitamin A, so we do not need to spend millions of dollars which  
33 would only benefit a handful of corporations at the expense of the  
34 poor farmers in the Third World.

35  
36 The other thing that we need to remember is, that people who suffer  
37 from Vitamin A deficiency, they have other vitamin deficiencies as  
38 well, and the reason for that is poverty which prevents them from  
39 buying adequate, you know, nutritious food. So, as one [inaudible]  
40 of UNICEF and United Nations has pointed out that as people's  
41 economic situation improves they eat a more diverse diet. Because  
42 of the problem of Vitamin A deficiency is poverty, we need a  
43 solution for the social disease called poverty; we do not need  
44 biotechnology or Vitamin A rice as it's being promoted to end our  
45 Vitamin A deficiency.

46  
47 And I also want to point out the latest report that has come out  
48 thanks to the work of Greenpeace, that any individual who lacks

1 Vitamin A would need to consume at least 9 kilograms of rice to be  
2 able to meet the requirements. Now, any individual that I know of  
3 is incapable of consuming that amount of rice per day.

4  
5 Quickly, I want to also touch upon the issue of intellectual  
6 property rights. If you are wondering, well, if there are all  
7 these problems why is this technology being promoted? What we  
8 forget that 80% of the food that is consumed in the north, the germ  
9 plasm of that came from my part of the world, it came from the  
10 south.

11  
12 So today over 1.4 billion people depend on farm saved seed as their  
13 primary seed source. Seed is the most important link in the food  
14 chain, and the corporations have realised that who controls the  
15 seeds control the food supply. With genetic engineering seeds are  
16 becoming the operating systems that the corporations are going to  
17 use to deliver new genetic technologies.

18  
19 Monsanto, for example, spent over \$8.5 billion acquiring seed  
20 companies. DuPont was not stupid to spend over \$9.4 billion to  
21 acquire Pioneer hybrid, which is the World's largest seed company.  
22 So, the fundamental issue is one of control, and corporations are  
23 using genetically modified patented seeds to dictate how farmers  
24 will farm, how indigenous communities will farm, and basically to  
25 control the public sector researchers.

26  
27 I want to ask the people who say that biotechnology Vitamin A rice  
28 and now these fancy seeds will actually benefit farmers in the  
29 Third World. They have not presented a rationale as to how  
30 dominator and traitor technology will bring any economic benefits  
31 to farmers in the Third World. In fact a recent report from Action  
32 Aid, the name of the report is "Syngenta, Switching Off Farmers  
33 Rights". It shows that AstraZeneca and Novartis, they have broken  
34 commitments not to divert the terminator technology.

35  
36 They have also taken out 11 new patents on this technology, traitor  
37 technology which requires special chemicals to switch on and off  
38 essential traits, which includes disease resistance, fertility,  
39 flowering, sprouting etc. Syngenta today owns 42% of the World's  
40 traitor and terminator patents, and this technology threatens to  
41 make poor farmers in the south dependent on feed and chemical  
42 companies from giant multinationals.

43  
44 So, remembering that 80% of the food that is eaten in the north,  
45 the germ plasm comes from the Third World, this is really about  
46 patent rights. Recently the Indian Government spent millions of  
47 dollars to get the neem seed patent revoked, and what do we? Find,  
48 this is important, money which could be used for making sure that

1 the nutritious levels of people improved in the country, instead of  
2 a Third World country having to battle these battles in Europe and  
3 elsewhere.

4  
5 The other interesting fact to remember might be, that neem patents,  
6 which was successfully challenged at the European Patent Office;  
7 seven months later it was used in New Zealand. How can you expect  
8 a Third World Government to continue fighting these battles in  
9 countries like New Zealand or England or America? It is just not  
10 fair, it is colonisation all over again.

11  
12 [Pause taken for stenographer]

13  
14 What I had mentioned was that the Indian Government was successful  
15 on getting the patent on neem revoked and it was successfully  
16 challenged at the European Patent Office, but only to be granted  
17 seven months later and to be used in New Zealand. It is not fair  
18 for a Third World country which is already financially trapped to  
19 be fighting patent battles for the germ plasm that belongs to the  
20 people and communities of the Third World in the north. It is not  
21 fair, it is colonisation of the resources.

22  
23 The other issue that I want to quickly touch upon, because I know  
24 the time is running out, is just recently in the United States a  
25 budget that was approved in October of last year; \$30 million had  
26 been kept aside, this is taxpayer's money in the name of foreign  
27 assistance to help Governments in the Third World in the regulatory  
28 agencies to learn how to approve GMO products.

29  
30 Now, we know with the StarLink corn controversy in the US that the  
31 EDA, FDA, USDA, they all stay in a country as modern as the  
32 United States, and these agencies have been asleep at the wheel,  
33 and to be so irresponsible; actually they are all the same in  
34 countries like India, that they would see them to approve  
35 genetically modified organisms in our food is diabolic. When a  
36 system does not work in a country like United States, to expect it  
37 to work in a country like Ukraine who is it still reeling from the  
38 impact of Chernobyl, or to say we can make it work with India which  
39 is still reeling with impact of the gas tragedy in 1984, of the  
40 Bhopal tragedy, it is diabolic that this is the kind of transfer  
41 that we're talking about in the 21st Century.

42  
43 And I suppose first that we do believe that there is enough food to  
44 feed the hungry. What we need is a political commitment, and I  
45 sincerely believe that the Royal Commission, by doing its job,  
46 New Zealand can pave the way for the rest of the world. This is a  
47 unique opportunity for New Zealand to take leadership on the issue  
48 of what is right and what is wrong. And it will be providing

1 leadership not just to the north, it will be providing leadership  
2 on behalf of the Third World countries as well.

3

4 Many of you might believe that this is to the benefit of the Third  
5 World. You might have heard statements from Ministers of  
6 Agriculture or the Prime Ministers. What you have to remember is,  
7 whether it was Abacha(?) in Nigeria, whether it was Marcos in the  
8 Philippines, whether it was Suharto in Indonesia, or whether it was  
9 Idi Amin in Uganda, they were considered legitimate Governments for  
10 too long; but this is an issue about democracy, and this is a  
11 challenge for the Royal Commission to determine what democracy  
12 really looks like. Thank you.

13

14 CHAIR: Thanks very much. Now, there may be some questions from you.

15

16 MR FORMAN: None from me.

17

18 CHAIR: Mr Hodson.

19

20 MR HODSON QC: No, sir.

21

22

23

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24

[3.52pm]

25

26 MR UPTON QC: My name's John Upton, can you hear me?

27

28 MS MITTAL: John?

29

30

MR UPTON QC: Yes, and I'm Counsel Assisting the Royal Commission. Can  
31 you hear me all right?

32

33 MS MITTAL: Yeah.

34

35 MR UPTON QC: I'll sit a little bit closer.

36

37 MS MITTAL: That will help, thank you.

38

39

MR UPTON QC: I just wanted to look at two points that came out of the  
40 paper that has been tabled by you with the Royal Commission. In  
41 one of your sections where you're dealing with genetic engineering  
42 you refer to the creation of superweeds, and you talk about pest  
43 resistance spreading from crops to weeds. Have you got any  
44 examples from that, or is that a theoretical risk?

45

46

MS MITTAL: Well, I want to first start that I am trained as a political  
47 scientist and as an economist, and I have been working with several  
48 scientists, including people like Doreen Stabinsky who has spoken

1 before me, and those are things expressed by people not just like  
2 Doreen, but by scientific journals such as Nature and Science.

3

4 MR UPTON: Yes, I understand all that. Because we're running against  
5 time a little bit can I move to the last paragraph in the paper  
6 that you tabled where you talk about the need to impose limits on  
7 corporate monopolies. You talk about the need to impose limits on  
8 corporate monopolies, what are you actually - what do you have in  
9 mind when you say that? What are you getting at?

10

11 MS MITTAL: Well, as my people have pointed out, we have to look at the  
12 economic vested interest of the people who are promoting  
13 biotechnologies; where we have the mergers taking place, where the  
14 seed companies are the same which are now controlled by the  
15 chemical companies who were earlier pushing pesticides and  
16 fertilizers. We have to look at the control of the World's food  
17 supply system. We have to look at the changing face of agriculture  
18 which used to be about small family farms, which used to be about  
19 local farming, which used to be about communities coming together.  
20 Today it has been replaced by industrial agriculture where a  
21 handful of corporations, whether it's Cargill or Aidenz(?) or  
22 whether it's chemical agribusiness such as Monsanto or DuPont, they  
23 control from, you know, from seeds, to the seeds, to the chemicals  
24 to actually growing the food, that has to be controlled.

25

26 MR UPTON: Yes, I understand that, but what are you talking about when  
27 you say "limits"? What limits do you have in mind?

28

29 MS MITTAL: Well, it would first of all be that we cannot allow these  
30 mergers to take place; as I mentioned, that Syngenta owns 42% of  
31 patents on traitor and terminator technology. That sort of thing  
32 has to stop by the judiciary and every Government in this world,  
33 because controlling our food supply system is going to result in  
34 losing our sovereignty, our national sovereignty.

35

36 MR UPTON QC: Can I finish then by moving to one other topic, and you  
37 say "we have to free academia from corporate influence". Is some  
38 corporate support of academia acceptable?

39

40 MS MITTAL: Well, I think where academia - it's very dangerous when  
41 academics and commerce come together, at least this has been our  
42 experience in the United States. We see land grant universities  
43 such as Davis or UC Berkeley today completely giving up on other  
44 emasculating which are based on sustainable ecological agriculture.

45

46 We find that companies like Novartis have managed to buy UC  
47 Berkeley for \$25 million over a period of five years, only to be  
48 talking about biotechnology. We have seen a similar thing happen

1 with the University of Tasgigy(?) which is not even a research  
2 university, to become the largest spokesperson for biotechnology.  
3 I think the problem is that, when academia fails to present the  
4 facts, when academia fails to do service to humankind, it is a  
5 problem. That we have to free our universities from corporate  
6 influence so we can finally listen to the truth, the truth the way  
7 we need to hear, and be presented with the facts.

8  
9 I have often debated with academics, whether they are from Davis or  
10 from Tasgigy(?) and not once have they been able to present the  
11 facts as to how biotechnology will end hunger or will be a good  
12 tool to end hunger. What I hear endlessly from them sounds like a  
13 PR campaign from industry that I can read in the New York Times.

14  
15 MR UPTON: Thank you very much, that completes all the questions I've  
16 got, but the Commission itself may have some questions. So, if you  
17 just stay on the line please.

18  
19  
20 \*\*\*

21  
22 [3.53pm]

23 BISHOP RANDERSON: Yes, thank you very much. I just wanted to, if you  
24 could tell us a little bit more about what you were saying about  
25 the surpluses, the 44 million tonnes of surplus of food grains, and  
26 I think you said 300 million out of the 800 million people in India  
27 are suffering from malnutrition. I wondered firstly, would that  
28 44 million tonnes be sufficient to feed 300 million? And the  
29 second thing I wondered, why - I mean, it seems a very obvious  
30 thing that a Government should distribute food amongst its own  
31 people rather than export it, and are there pressures on the  
32 Government, for example, to generate export earnings, or are there  
33 economic issues to do with keeping the prices up or something like  
34 that, that means that that grain is not distributed within India?

35  
36 MS MITTAL: Well, thank you very much for your question. In some of the  
37 food surplus, I'm sure 44 million tonnes would not be, you know,  
38 adequate to feed the 300 million people, but it is a move in the  
39 right direction. Here what I wanted to challenge was that, it is  
40 not the shortage of food production; the food can be produced. We  
41 have a situation where say the State of Punjab, which has been  
42 called the granary of India, or the State of Haryana which has been  
43 called the granary of India and produced a surplus every year, are  
44 today being told to grow food. For example, Punjab grows cattle,  
45 grows wheat, but it is all being exported to feed the dogs and cats  
46 of Europe.

47  
48 For example, Royal Canine a French company, has set up operations

1 to take the food directly from Punjab and to convert it into dog  
2 and cat food for Europe while the people of this country starve.  
3 Haryana, which used to be another rich place for growing wheat and  
4 other food grains, is today growing tulips for Holland. So, when  
5 we think of tulips, we can no longer think of the windmills in  
6 Holland, we have to think of Kenya and places like Haryana in  
7 India.

8  
9 So, that is related to the question you have, it's related to your  
10 second question, which is, why is the India Government doing it?  
11 We have to look at social policies such as the trade agreement.  
12 Yes, the India Government is under a lot of pressure from the World  
13 Bank which has given loans to India even in the 90s with the  
14 conditionality that India buys wheat from Cargill, a US based  
15 corporation.

16  
17 Last year when I was in India there were reports from farmers who  
18 were actually burning crops in the field because Indian Government  
19 said it already has a surplus and therefore is not going to buy  
20 from its own farmers. But at the same time it had invited an  
21 American company, Rice X, which brought into a joint collaboration  
22 with the multinational corporation Monsanto to produce patented  
23 technology for nutritious food; basically to convert the cattle  
24 seed rice brand into human food.

25  
26 So, while the surplus grains in India are being exported overseas  
27 because we are told that is a good way to earn some foreign  
28 exchange, and this food goes to feed the cattle in the West, the  
29 Government is encouraging American companies to convert cattle feed  
30 into food for human beings in India. And, this is basically  
31 shameful, it is just too obvious. I've been trained as an  
32 economist and it just does not make sense.

33  
34 You know, we are exporting the same amount of food and the same  
35 food grains that we are importing, it makes no economic sense, and  
36 India is not unique there. As I mentioned, about 73% of countries  
37 which have child malnutrition, they're all food exporting  
38 countries.

39  
40 BISHOP RANDERSON: Thank you very much, that's a very helpful answer.

41  
42 CHAIR: Is it your intention that Dr Mittal stay on the line?

43  
44 MS HOWARD: Yes, it is. I'd just like to notify her of that.

45  
46  
47 [Ms Mittal stays online while video link  
48 established with Massachusetts]

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CHAIR: Good afternoon, Professor King, can you hear us?

PROFESSOR KING: Yes.

10 CHAIR: Thank you. I think you are looking at - in the distance of your  
11 screen the Royal Commission. I'm the Chair, Thomas Eichelbaum, on  
12 my right Bishop Randerson, on my immediate left Dr Fleming and on  
13 my far left Dr Alan. What is it, good morning, is it, where you  
14 are?

15  
16  
17  
18

PROFESSOR KING: It's 10pm in the evening where I am. What time is it there?

19 CHAIR: It's late afternoon here. So, good evening to you and thank  
20 you for joining us. And, we're looking forward to hearing your  
21 presentation.

22  
23

PROFESSOR KING: Shall I begin?

24  
25

CHAIR: Yes, please.

26  
27  
28  
29

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[4.07pm]

30 PROFESSOR KING: Well, good afternoon, I want to thank the distinguished  
31 members of the Commission for hearing my testimony. I'm sorry I  
32 was not able to be present in person, but I'd also like to applaud  
33 the Government and people of New Zealand for embarking on this  
34 process. I wish we had an equivalent process in the United States.  
35 Am I transmitting?

36  
37

CHAIR: Yes, very well, thank you.

38  
39  
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48

PROFESSOR KING: Please note that I speak as a working scientist  
intimately engaged in genetic engineering and biotechnology. My  
early scientific work contributed to the development of phage  
vectors for cloning technology and my current scientific work  
involves the use of genetic engineering to solve folding production  
problems for therapeutically important proteins.

The advances in molecular genetics biochemistry and cell biology  
provide extraordinarily new possibilities for preventing and

1 treating disease for a deeper understanding of the interaction with  
2 organisms with each other and their environment and for entirely  
3 new manufacturing technologies. However, living organisms are  
4 self-reproducing; qualitatively different from all mechanical,  
5 electronic or other manufactured objects.

6  
7 The genetic modification of organisms therefore brings social  
8 environmental and health risks of a new type much deeper and more  
9 serious than previous pollution hazards. Despite the problems of  
10 pollution from heavy metals from polyaromatic hydrocarbons or  
11 petroleum spills, these noxious materials do not reproduce  
12 themselves in the environment. Even radioactive isotopes decay  
13 away; where organisms once inadvertently established in the ditch  
14 are extremely difficult to call back. Here in New England this  
15 would include the Dutch Elm disease which killed off the Elm trees  
16 in New England, the chestnut blight which killed off the chestnut  
17 trees. In our Great Lakes the zebra mussels are displacing native  
18 species. Around the globe the HIV virus is killing people in  
19 nations around the world.

20  
21 The breakthrough that allowed genetic engineering represents 50  
22 years of public funding of biomedical research and agricultural  
23 research. This public investment was directed towards protecting  
24 human health, protecting food crops and alleviating the ravages of  
25 disease. The extraordinary rich and rapid progress of these  
26 discoveries flowed from explicit national policies, shared  
27 resources and open communications. This was true in the  
28 United States, in Great Britain, in Canada, in Australia,  
29 New Zealand, France, Netherlands, Denmark and other countries.

30  
31 These extraordinary technologies, the reason we're here today in  
32 this forum, modern genetic engineering and biotechnology, took  
33 place outside the patent system. In fact it was precisely because  
34 life patents were not allowed prior to the Chakrabarty decision  
35 that scientists and citizens all over the world have success to the  
36 extraordinary technologies, amino acids sequences, protein  
37 biochemistry, cloning gene sequences, all the wonders of modern  
38 molecular biology.

39  
40 Frederick Sanger from Britain's Medical Research Council who  
41 developed both the technology for determining the amino acid  
42 sequence in proteins and the first technologies in determining the  
43 nucleotide sequence of genes; he didn't patent those developments,  
44 he shared them with people all over the world, and you can find  
45 them in any lab in the North Island or the South Island.

46  
47 Jonas Salk developed a vaccine that was produced and delivered in  
48 millions of doses. His team was ambitious, but for recognition not

1 for enrichment. He was the person who, when asked why didn't he  
2 patent his vaccine, he made the comment about, "he might as well  
3 patent the sun". That was the notion that these vaccines were  
4 inventions was fallacious.

5  
6 Now, the scientific and technical workers who built this foundation  
7 were engaged as public servants and the help of modern science and  
8 technology still depends on the ability to mobilise thousands of  
9 talented people to work to the public interest and not for profit  
10 gain.

11  
12 Now, I want to speak more explicitly about the question of gene  
13 patents. The vast majority of the genes of all animals, plants and  
14 microorganisms on the surface of the earth have evolved over  
15 millions of years. The species that are most important to humans,  
16 horses, pigs, cattle, grasses, trees and tubers have evolved over  
17 hundreds of millions of years. The very small number of species  
18 that are the basis of human nutrition have been domesticated over  
19 the past 10,000 years; the husbandry and input of generations of  
20 humans all around the world.

21  
22 The genes and cells and molecules of these organisms are in a  
23 deeper sense products of nature, they are not inventions of  
24 individuals, corporations or institutions. Elements and minerals  
25 cannot be patented because they are found and discovered and not  
26 invented. The claim that the determination of the nucleotide  
27 sequence of the gene represents a novel invention is deeply  
28 specious and misrepresents profoundly the nature of genes and  
29 proteins and organisms.

30  
31 But the fundamental issues that you're addressing are questions of  
32 social policy and not legal interpretation. Patent laws are  
33 passed, modified and abrogated by national parliaments just as  
34 other laws governing the country; they're a means for social  
35 progress, not an end in themselves.

36  
37 And, the granting of patents on gene sequences represents a very  
38 deep misuse of the patenting system and the kind of private  
39 expropriation of the fundamental - the common biological heritage  
40 of all human beings. It is the equivalent with trying to privatise  
41 the ocean, or the atmosphere, or the moon. If allowed to continue  
42 it will become a major impediment to social, scientific, medical  
43 and agricultural progress.

44  
45 Now, I'd like to comment on two aspects of patents. A patent, as  
46 you heard in your testimony, a patent allows the owner to exclude  
47 others from benefitting from the patent process of construct or  
48 matter. The patent holder can prevent other efforts to produce or

1 utilise the invention even if for medical uses for human welfare.  
2 In fact it's precisely because patents allow you to suppress all  
3 competition to keep all other institutions out of the market,  
4 that's why they're so valuable to those corporations that hold  
5 them. The mechanism of exclusion takes the form of infringement  
6 suits, injunctions against sales of products and other forms of  
7 litigation threatened or actual. Hundreds of millions of dollars  
8 worth of suits are brought regularly as corporations and even  
9 universities, other institutions, manoeuvre for control of the  
10 monopolies which follow from patent ownership.  
11

12 Now, I'd like to clarify two further points; patent lawyers often  
13 speak with about how patents require the revealing of the  
14 information. In the area of modern biological research this  
15 profoundly misrepresents the actual use of patents. In the normal  
16 course of modern biological research scientists are striving to  
17 publish and reveal their results; this is their stock and trade in  
18 currency.  
19

20 The intervention of the patent system reverses that. Patent Law  
21 requires that the subject of the patent, if it's been previously  
22 been revealed, that is it becomes prior art, then the patent would  
23 be disallowed. Thus oral reports, abstracts, grant proposals,  
24 public papers all constitute prior art. As a result individuals or  
25 groups planning to file for a patent have to avoid public  
26 disclosure of their work prior to the filing of a patent claim.  
27 Patent attorneys regularly advise researchers to restrict their  
28 presentations to colleagues, don't show your work, don't know your  
29 notebook, don't give that talk so as not to jeopardise the planned  
30 patent submissions.  
31

32 This has reversed the half century culture of free and open  
33 communication in the scientific cultural communities. It's quite  
34 chilling when you actually experience it. It's now common to go to  
35 a scientific meeting, you ask your colleague a question and you're  
36 told, well, he can't answer it, she can't answer it because there  
37 are intellectual rights issues that bear on the question. And of  
38 course in those cases they're telling you that, then you realise  
39 how many times the speaker is not telling you that they're  
40 withholding information because of patent, because of pending  
41 intellectual property rights.  
42

43 So it introduces a chilling secrecy where openness is essential,  
44 slowing and misdirecting biomedical and agricultural progress. You  
45 had some testimony as a side issue from the Trade Union  
46 representative around the question of getting access to safety  
47 information, which is constrained because of the need to prevent  
48 publication prior to patenting.

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The second point I want to deal with is the way in which life patents retard the development of social use of technologies, not research but the actual technological development in agriculture and healthcare, and this is - it's much more likely it will happen faster in New Zealand than it does in other countries. The key commercial value of the patent is the ability to prevent competitors from developing or delivering a later superior product.

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I gave an example in my written testimony that the Biocyte Corporation will obtain the patent on the use of blood cells from the umbilical cord, and the medical community published an open letter protesting the granting of the patent because they were concerned that it would discourage and threaten nonprofit use of this technology. It's noteworthy that in India, Brazil and other countries patent laws excluded pharmaceutical and other healthcare products from patenting on the basis of protecting the public welfare.

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I've served as an expert witness in one particular case in which a large US firm which had many patents on an important therapeutic protein involved in treating stroke and heart disease. A European firm had developed a much better form of the protein, more efficacious, and could help save more lives. The strategy of the patent holder was to use their patents to keep the competition from bringing their therapy to the market. They charged them with infringement, obtained injunctions in the US court against the marketing, litigated for years and successfully used the patents to keep the better drugs from coming to market; despite expert witnesses on the other side. And, of course, if you read business journals and texts you will find that in that literature patents are described, not as advancing technology, but it's a mechanism of suppressing competition, keeping prices and profits high.

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Now, I suspect that there is a concern in New Zealand that in the absence of life patents New Zealand's natural resources, very rich and unique resources will not be developed, our scientific community will not thrive. On the contrary, I will suggest that this is the best course for you to follow to develop your resources widely in a fruitful manner. Almost certainly the giant global corporations like Monsanto, Novartis, Glaxo, do not have New Zealand's development high on their agenda.

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Local scientists in your country will find yourselves increasingly hemmed in by patent selling like Monsanto, Novartis, Glaxo. They will, for example, develop a genetically modified cytochrome C in some plant. And, given the fact that cytochrome C in all organisms are very similar, the claim that the patent covers genetic

1 modification of that gene in any plant for whatever purposes and  
2 increasing the utility of the plant; the creativity and dedication  
3 of your biological agricultural resources will almost certainly, as  
4 the years go by, be increasingly thwarted and hemmed in by the  
5 aggressive enforcement of broadly written patents by these  
6 trans-national corporations with very deep pockets and very large  
7 staffs of patent lawyers. Your own agribiotechnology efforts will  
8 be constrained or bought up and tied up.

9  
10 On the other hand I noted in some of the testimony which I had the  
11 privilege of reading, I think again from the Trade Union  
12 representative and maybe others who testified before you,  
13 New Zealand has a distinct character as an island nation and it is  
14 one of the few nations that can probably convince the World's  
15 consumers that its products was free of genetically modified  
16 material. I think that the possibilities of commanding a market  
17 far more likely by taking that mode than by trying to compete in a  
18 global market where real concern for nutrition and productivity is  
19 very low.

20  
21 I am at the end of my time. I want to point out that in most  
22 testimony concerning this extension of the patent system to living  
23 organisms, the United States experience has given us the example,  
24 in particular the Chakrabarty decision in 1980 in the US Supreme  
25 Court which allowed by a very narrow 5 to 4 decision the patenting  
26 of a genetically modified organism.

27  
28 I want to point out to you that the United States Congress has  
29 never publicly discussed this issue, there have never been public  
30 hearings in the United States held by the United States Congress.  
31 The extension of that decision to first genetically modify genes  
32 and then to naturally occurring genes, was done by the Patent  
33 Office under pressure from the biotechnology and pharmaceutical  
34 industry, and I believe that these decisions, as the general public  
35 and the scientific community becomes aware of how broadly these  
36 impact on our society, that we're going to see in nations, as we  
37 already have seen all over the world, opposition to these - this  
38 very unsound policy, and that you will not be alone in taking your  
39 position against it.

40  
41 I haven't talked about the connection between patenting and safety  
42 of genetically modified crops. They're directly coupled; the  
43 reason that firms like Monsanto have pushed ahead so rapidly,  
44 lacking any basic safety information, lacking any basic - the real  
45 kind of years and years of field trials that you need, the years  
46 and years of product safety and nutrition testing, is because the  
47 ability to patent these genetically modified plants gives them a  
48 monopoly position that they do not have with respect to naturally

1 occurring varieties.

2

3 And so they have moved full speed ahead to capitalise this.  
4 Roundup Ready soybeans makes no contribution to human nutrition, it  
5 doesn't make any contribution to the farmer, it makes contribution  
6 to Monsanto's ability to continue to sell Roundup. There's no  
7 social, agricultural, nutritional reason to have millions of acres  
8 planted with those crops. It's driven by the fact that the  
9 monopoly position given by the gene patents allows a business  
10 advantage which is very different than an agricultural advance.

11

12 MS HOWARD: Professor King, I'm sorry to interrupt you, you're out of  
13 time.

14

15 PROFESSOR KING: Thank you for giving me the opportunity to testify, I'm  
16 happy to answer any questions.

17

18 CHAIR: Yes, we'll have some questions. Mr Forman, do you have any?

19

20 MR FORMAN: None from me.

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25 [4.22pm]

26 MR HODSON QC: Professor King, my name is Hodson and I'm a barrister,  
27 counsel, retained by the Life Sciences Network and you will  
28 probably be stressed to hear that in that context Monsanto, Aventis  
29 and people like that are amongst my clients. So, having made that  
30 clear there are just a couple of topics I want to ask you about.  
31 If the private sector isn't able to patent a particular discovery  
32 that it feels it's able to make, isn't that going to affect its  
33 interest in investing in that discovery?

34

35 PROFESSOR KING: Well, there's no doubt that the patents, because they  
36 increased the ability to have a monopoly position, they provide an  
37 advantage in terms of prices and profits. On the other hand, the  
38 notion that these firms will go out of business or they won't be  
39 able to sell their products, has no basis in fact. Many many many  
40 major corporations in the world, you know, from beer brewers  
41 to auto manufacturers sell their product, not because they have  
42 patent monopolies, but because they do a better job on producing;  
43 they produce a better product or they deliver it at a lower cost.

44

45 So, I do not believe that the biotechnology, that the  
46 pharmaceutical industry, would disappear in the absence of patents.  
47 Their greater profitability in the United States that are the most  
48 profitable corporate sector, may go down, but it will just open up

1 the field to competition. In the case that I described to you, the  
2 firms that I was representing had a much better product and they  
3 were willing to market it without a patent monopoly. They knew  
4 there were hundreds of thousands of people out there who would pay  
5 a fair price for it.

6  
7 So, I believe that the ability to attract venture capital, those  
8 people who are looking for a one hundred to one investment, yes,  
9 that will shrink, but venture capitalism is the only way of  
10 developing commercially viable products.

11  
12 MR HODSON QC: We have a rather different economy down here. We don't  
13 have the enormous multinationals and we don't have the very great  
14 foundations that the United States has the advantage of, so that if  
15 the private sector here is discouraged, what one does in this  
16 country is look to the Government, and I have to tell you that in  
17 this country that's not a very good look. The point here is that  
18 if we in New Zealand restrict patenting when countries such as the  
19 USA carry on the present practice, aren't we rather cutting off our  
20 nose to spite our face?

21  
22 PROFESSOR KING: I sincerely doubt that your native industry would be  
23 able to protect their patents against the giants that they're in  
24 competition with. As you know, patenting doesn't have very much to  
25 do with who's rights - I mean, there's a very long protracted legal  
26 - litigations are usually - and very often the victory goes to the  
27 one who can, you know, who can stay in the battle with as deep as  
28 pockets as someone in your testimony says. I find it very  
29 difficult to imagine that, if you tried to establish a patent  
30 position around a product that had a world market, that you'd be  
31 able to defend it. I think you're far better off declaring  
32 New Zealand a patent-free zone.

33  
34 MR HODSON QC: Thank you for the thought; we had managed it in some  
35 spheres. I have in my hand a book, and I regret that I'm not able  
36 to show it to you now in any meaningful sense; it's a publication  
37 by the International Service for the Acquisition for Agribiotech  
38 Applications, ISAAA. Are you familiar with that institution?

39  
40 PROFESSOR KING: No.

41  
42 MR HODSON QC: Well, it's an international research organisation, and  
43 this particular book is financed by the Rockefeller Foundation  
44 which you will understand when I tell you that the title of the  
45 brief is The Intellectual and Technical Property Components of  
46 Provitamin A Rice; in other words, Golden A rice. You are familiar  
47 with Golden A - golden rice?  
48

1 PROFESSOR KING: Yes.

2

3 MR HODSON QC: Essentially, the situation there is that a very large  
4 number of patents were combined, free of charge I think largely by  
5 the owners, in order that this particular product had become  
6 possible.

7

8 PROFESSOR KING: Well, you know, I would have thought that that example  
9 would have been brought in on the other side. Agricultural  
10 scientists all over the world, in almost every nation of the world,  
11 understand the importance of rice in human nutrition. They also  
12 understand the importance of learning about the genes that control  
13 the rice plant determining the sequences of those genes. So,  
14 determining the sequence of rice genes and learning about rice  
15 genes, there's nothing novel about that, that's what agricultural  
16 scientists are doing all over the world.

17

18 To have a situation where one company owns the patents on rice,  
19 which is a crop that developed out of the nurturance of, you know,  
20 thousands of years of culture in Asia and the Middle East and other  
21 parts of the world, you know, that is doing much more to slow down.  
22 All the packaging that they had to do to put together that  
23 situation, they would have been able to proceed much much more  
24 rapidly if the patents hadn't gotten in the way of developing of  
25 the strains.

26

27 Believe me, patents had nothing to do with developing of Vitamin A  
28 rich rice. The rice doesn't have enough Vitamin A to actually have  
29 any impact on nutrition whatsoever. You know, it wasn't - there's  
30 nothing particularly --

31

32 MR HODSON QC: Professor, we've had a lot of discussion about the rice,  
33 and I think I know what it is.

34

35 DR STABINSKY: If I may add a comment here; I think you've slightly  
36 misrepresented this ISAAA report.

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38 MR HODSON QC: Please correct me.

39

40 DR STABINSKY: In the introduction to the report it actually says that  
41 there is approximately 70 patents, and I believe 36 other types of  
42 intellectual property protection on the components of the Vitamin A  
43 rice. And in fact the intellectual property of all of those  
44 patents, that they're owned by a wide variety of companies  
45 involved, and in fact freedom to operate, the freedom to utilise  
46 the inventions patented has not been negotiated.

47

48 And in fact the report outlines six different options for actually

1 dealing with these intellectual property constructs once Vitamin A  
2 rice were to be marketed, were to be commercialised. And, in fact,  
3 one of the options that's presented in this report is the option  
4 number four, to ignore all intellectual property. That, in fact,  
5 these patents are a severe constraint on, in fact, the  
6 International Rice Research Institute to be able to eventually  
7 release Vitamin A rice, and they haven't been resolved, and that's  
8 why the Rockefeller Foundation commissioned this report to try and  
9 see what options were available to deal with this incredible tie-up  
10 of Vitamin A rice by all of these different intellectual property  
11 committees.  
12

13 MR HODSON QC: I think that's absolutely right, if I may say so. But  
14 the end result, as I understand it, and we've had some evidence  
15 about this, is that Professor Potrykus has found it necessary to  
16 take out patents of his own. I table this, sir, just to point out  
17 the intricacies of the subject. No more questions.  
18

19 PROFESSOR KING: Can I point out that one way of protecting a discovery  
20 is to patent it; the other way to protect it is to publish it,  
21 because once it's out in the public domain it can't be patented and  
22 privatised. Once again, the race for the human genome, the public  
23 consortium, they publish their results as soon as possible because,  
24 the moment it's in the public domain no corporation or institution  
25 or individual can patent it and, therefore, restrict it. So, that  
26 still is absolutely a superior way of protecting access to  
27 information, is to make it available, to put it in the public  
28 domain.  
29

30 MS MITTAL: You know, the line hasn't been very clear, but one thing I  
31 did want to say, the point that was made that if the private sector  
32 is not able to patent, then it would not have any reason to invest  
33 its resources for innovation. I just want to add that the only  
34 reason we will colonise Third World resources and colonise the  
35 communities in the Third World for the germ plasm is so that we can  
36 benefit economic interests of few corporations, I think that is the  
37 ethical question we need to ask rather than say why the few  
38 corporations will be investing in it.  
39

40 And I also want to point out that the Indian Patent Act of 1970  
41 basically made it clear that pharmaceuticals and agricultural  
42 products should not be patented keeping in mind the interests of  
43 the working poor. So, this is another ethical question. Have we  
44 reached a point where we do not care about the interests of the  
45 poor who might be denied, whether it's farmers, our communities in  
46 Third World who might not have access to lifesaving drugs; so that,  
47 few corporations based in the north can benefit from it. That  
48 needs to be the question.

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CHAIR: Now, Mr Upton?

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[4.34pm]

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MR UPTON: Professor, my name's John Upton and I should be about right in front of you in the bottom right-hand corner of your screen.

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I'm Counsel Assisting the Royal Commission and I've just got some

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general questions that I want to talk to you about. As professor

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of molecular biology at the MIT, are you allowed to personally

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patent discoveries that you might make, or do you assign that right

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over to the school?

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PROFESSOR KING: It's some kind of sharing arrangement. Since I myself

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do not - have not applied for patents on my own work, I'm not

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intimately familiar with the arrangement. But the arrangement is

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that you're an owner of the patent and it's kind of jointly shared

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with the institute.

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MR UPTON: It's just that --

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PROFESSOR KING: If there's royalties, they're shared.

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MR UPTON: Sure. It's just that in New Zealand as I understand it

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scientists working in our Crown Research Institutes assign their

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rights across to their employer, so the rights then belong to their

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employer to patent and I just wondered if it was a similar

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structure; obviously it isn't.

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PROFESSOR KING: In the US, that is the situation with US corporations

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when you work in a corporation - my students who work in

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corporations, when they're working on material that there will be

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patent claims on it, those will be owned by the company and not by

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the individual. But in the university environment it's a little

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different.

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MR UPTON: Thank you.

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PROFESSOR KING: So, this varies from university to university. In the

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United States, it's not uniform across the - it's not national

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policy, it's local policy.

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MR UPTON: Thank you. Does your department get funding from corporates?

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PROFESSOR KING: Yes. I get funding from corporations; whose policies I

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don't agree with.

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MR UPTON: Fine. It's an issue which has come up for discussion on several occasions before the Royal Commission. How do you preserve your integrity, if I can put it bluntly?

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PROFESSOR KING: Well, you know, I have been involved with these issues since the original Chakrabarty case, I testified the first - the Federal Government that - well, the first hearings that existed on these subjects. I have long involvement around public policy but I'm also, I make my living as a researcher.

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And of course, one of the things about these corporate grants is they make life extremely difficult for, in some ways for an honest scientist because, if you view your contribution as you're going to develop knowledge, in my case on protein folding that's available to the World's community, and then you have a contract that says that you can't publish, you can't reveal - you can't report the results without getting the "okay" from the company, you're very sharply constrained.

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21

That's a major problem in terms of the education of graduate students where you're trying to educate them to become national servants, get the support on contracts that are corporate contracts. So, that is a real struggle, and the introduction of the ability to patent these inventions made it much worse because then individuals could personally profit from keeping their discoveries essentially private.

28

29

So, in my experience, which is considerable with these corporate grants, they enrich the individual and they damage the nation. That's in my case. My laboratory, I won't name the company, but we do contract research, we have a contract with them; it's important research for them, we're able to do it extremely well. I don't think - it would be much better if it was funded from the public sector.

36

37

MR UPTON: But if you get funding from --

38

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PROFESSOR KING: And the great advances in the United States were because of the enormous public investment, because of the free and open communication. We wouldn't have genetic engineering technology if it wasn't that all of the people who made the key discoveries revealed them to the general scientific community. That's why in New Zealand your scientists can clone genes and sequence genes and introduce them from one cell to the other, because the founders of the field did it as a service to the whole human community, they did not privatise it.

48

1 MR UPTON: When you get funding from a corporate, do they tell you what  
2 areas you're to use that funding in, or do they leave it to you?  
3 In other words --  
4

5 PROFESSOR KING: It's quite closely specified.  
6

7 MR UPTON: Do you ever find --  
8

9 PROFESSOR KING: And nor can we report our results without permission.  
10

11 MR UPTON: And do you ever find that you're in difficulty because of  
12 tags on the funding?  
13

14 PROFESSOR KING: Oh, yes. Yes.  
15

16 MR UPTON: How do you deal with those difficulties in practical terms?  
17 Do you tell them to take the cheque back?  
18

19 PROFESSOR KING: In many cases we decline - we decline to accept these  
20 contracts. I can think of many cases where there are areas of  
21 research where I thought that - it wasn't just a question of being  
22 restricted from public discussion, it was that there were real  
23 safety and, you know, dangerous - there were issues of safety  
24 considerations and things that were unsound directions, and so you  
25 declined to do that. But, once you are in a patent - once  
26 patenting is established, as is the current situation in the  
27 United States even though it's an intense debate, you're under  
28 pressure to proceed in that, you know, in that direction, you're  
29 constrained as everybody else is constrained.  
30

31 MR UPTON: Do you actually have --  
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33 PROFESSOR KING: But that's a very difficult --  
34

35 MR UPTON QC: I'm sorry, please continue.  
36

37 PROFESSOR KING: It's very difficult - it's difficult for the  
38 individual, but it also, it retards the development of the field.  
39 In the area that I work, which involves solving - one of the things  
40 that I actually work on is solving protein production problems in  
41 the biotechnology industry, and many firms file for patents on  
42 these tech advances, they don't share it with other firms, and  
43 these problems which could be solved easily if this stayed in the  
44 public domain, are solved much more slowly because of each company  
45 trying to establish a patent position around this particular  
46 application of certain technologies.  
47

48 MR UPTON: Do you have protocols in place which deal with issues that

1 arise out of funding by corporates, or do you deal with any  
2 problems on a case-by-case basis?

3

4 PROFESSOR KING: We don't sit - the kind of - this kind of debate right  
5 now, where you have a Commission, it's formally put in place by the  
6 Government, it has some kind of public presence and public  
7 credibility, we do not have that debate in the United States,  
8 right. I am very knowledgeable on this subject, my department has  
9 never asked me to speak publicly in the department on this issue,  
10 this is a very controversial issue, they're trying to get contracts  
11 from these various biotechnology corporations who are trying to get  
12 patent monopolies, there's no encouragement of a public debate.  
13 Students will occasionally invite me to speak on the subject. The  
14 episcopal chaplaincy will invite me or other people to speak on the  
15 subject. But we are not yet able to have an open discussion on  
16 these ethical problems.

17

18 MR UPTON: Perhaps I didn't make myself clear, but I was asking whether  
19 you actually have formal protocols which allow you to deal with  
20 issues arising from funding by corporates of the sorts of work you  
21 are doing, or whether you deal with those problems on a  
22 case-by-case basis as and when they arise.

23

24 PROFESSOR KING: It's on a case-by-case basis.

25

26 MR UPTON: Thank you very much.

27

28 PROFESSOR KING: It's private. There's no public - it doesn't happen in  
29 any public arena.

30

31 MR UPTON: No, I understand that. Can I finish now by asking you a  
32 specific question about your paper that you delivered last year.  
33 You mentioned in your paper at paragraph 21, for the record, that  
34 the Dutch Government had formally appealed one of the decisions  
35 favouring gene patenting to the European Court of Justice. Are you  
36 able to tell us what the outcome of that appeal was, or are we  
37 still waiting?

38

39 DR STABINSKY: It's still pending.

40

41 PROFESSOR KING: I believe that we're still waiting.

42

43 MR UPTON: Thank you very much.

44

45 PROFESSOR KING: I believe that those procedures go extremely slowly.

46

47 MR UPTON: There must be lawyers involved.

48

1 PROFESSOR KING: Well, from many nations in the European Court this is.

2

3 MR UPTON: Thank you very much professor, that completes my questions,  
4 but there may also be questions for you from members of the  
5 Royal Commission itself. So, just stay online.

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11 [4.43pm]

12 CHAIR: Professor, I apologise if I have misunderstood the thrust of  
13 your questions, of your submissions, but it seemed to me that many  
14 of the arguments that you advanced applied to patents generally  
15 rather than specifically to patents relating to life forms. Would  
16 you comment on that?

17

18 PROFESSOR KING: Excuse me, could you repeat the question please? There  
19 was some interference.

20

21 CHAIR: Yes. I said, it seemed to me that many of the arguments that  
22 you advanced in your presentation applied to patents generally  
23 rather than specifically to patents on life forms. Have I  
24 misunderstood you.

25

26 PROFESSOR KING: Well, I'm not - you know, I'm - my experience is in the  
27 world of biology and genetic engineering and that's where I have,  
28 you know, paid very close attention, been surrounded by the  
29 development of the events, and that's where I feel I can speak, you  
30 know, with experience and knowledge.

31

32 In the realm of mechanical devices, I don't have direct experience.  
33 I know there are many people who share - who have the same views  
34 that I have, that would say the same things around mechanical  
35 inventions that patents have - has often been the mechanism to  
36 support innovation. But I myself am only knowledgeable in the area  
37 of biology and, of course, for hundreds of years - for many many  
38 hundreds of years living organisms were excluded from the patent  
39 system.

40

41 You know, in the United States the patent laws were written under  
42 the supervision of Thomas Jefferson, our first Secretary of State.  
43 He was a plant breeder, he was intimately aware of the commerce in  
44 ornamental and other plants, but he excluded living creatures from  
45 the patent laws. I believe, you know, on the grounds that they  
46 weren't inventions but secondly they were just too important to be  
47 left to become private property.

48

1 CHAIR: Now, I understand that, but it seems to me --

2

3 PROFESSOR KING: He was all for patents of waterwheels and windmills, he  
4 held those patents; he just didn't believe that patents laws should  
5 be extended to agriculturally important developments.

6

7 CHAIR: It seems to me that, if you argue on grounds that the patent on  
8 life forms stifles research, that it stifles public access to the  
9 results of the research, and that it aggregates powers in the hands  
10 of a few companies, it did seem to me that all those arguments  
11 could equally be applied to patents on anything at all.

12

13 PROFESSOR KING: That may be, but that was not my - my testimony is -  
14 comes from investigating these situations with respect to  
15 biomedical research which is a creature of the 20th Century, right,  
16 maybe a little earlier, right, and grew up in an environment that  
17 didn't exist earlier in history where the major activities were  
18 publicly financed, and it wasn't individual gentlemen, you know, in  
19 the Royal Society who were carrying out its various experiments by  
20 Benjamin Franklin in Philadelphia, it was a social institution.

21

22 All of my education, my training, my postdoctoral work, all the  
23 research and all the people I've trained for 30 years, it's all  
24 dependent on the fact that there was a national policy to advance  
25 biomedical knowledge for the general public good, and that's the  
26 context in which gene sequence has come into human history.

27

28 CHAIR: Do you think cost of research has got something to do with it?  
29 We hear figures of many billions of dollars required to develop  
30 many of these technology advances of today. It's a very --

31

32 PROFESSOR KING: One thing that's very clear that a significant fraction  
33 of that is paid to patent lawyers working on development of the  
34 patent claims. I don't believe that that's true. It's expensive -  
35 no, I don't believe that - I don't believe it's true that it costs  
36 billions of dollars to develop, you know, a better strain of  
37 cassava if you're not trying to get a private monopoly over it.

38

39 CHAIR: Thank you.

40

41 PROFESSOR KING: Because you have access to all of the World's research  
42 in that area. Your New Zealand scientists don't have to re-expend  
43 the billions of dollars spent in Great Britain on working out the  
44 structures of proteins. All of that technology has been made  
45 freely available to them. The crystallographers in Christchurch  
46 has to sit on 50 years of public - of shared knowledge and  
47 technological development; the proposal of the biotechnology  
48 industry that we've reached a point in history where, unless we

1 privatise, this progress will be thwarted.

2

3 The thrust of my testimony is that the truth is just the opposite.  
4 Is that, if we want to unleash the benefit of the technology -  
5 these technologies for our peoples, we have to resist this effort  
6 to privatise, which will have just the opposite effect; and all you  
7 have to do is to pick up the Science and Nature and read all these  
8 examples of infringement suits and companies suing another company,  
9 companies suing research scientists. If I had more time I would  
10 give you many examples of my own research where we're unable to  
11 move forward because people won't share information because they're  
12 going to patent it and privatise it.

13

14 DR ALLAN: Professor Morris, I am Dr Alan.

15

16 CHAIR: King.

17

18 DR ALLAN: Professor King, sorry. I'm Dr Alan. There's this issue that  
19 the patents expire after 20 years. One of the comments that we  
20 have heard is that some of the enabling technologies which have  
21 patents on them have been taken out so early that the companies who  
22 own the patents might not get a return in those 20 years when that  
23 technology becomes a part of the public domain. Could you comment  
24 on that?

25

26 PROFESSOR KING: Well, you know, large companies with big patent  
27 holdings, they have very sophisticated strategies. You can learn  
28 about them at our Sloan School of Management, where I'm sure you  
29 can probably learn about it better at a Business School in  
30 New Zealand. They're very sophisticated strategies for trying to  
31 affect the life. In the drug industry, for example, a year or two  
32 before the patents on some antibiotic is going to expire, they'll  
33 bring out a version just sufficiently modified so that they can get  
34 a new patent granted on that one that extends for another 20 years,  
35 and then they put all their advertising dollars into supporting the  
36 new product to try to keep the same market. There are many such  
37 crisis. That doesn't meant that genetic modification --

38

39 DR ALLAN: Doctor King, I'm a doctor --

40

41 PROFESSOR KING: -- that what you describe --

42

43 DR ALLAN: I'm very aware of generic medicines, I think New Zealand has  
44 some conflicts with some of the biotechnology firms over our use of  
45 generic medicines to reduce the drug bill. But separate than that  
46 the question is, these enabling technologies will then enter the  
47 public domain and we're talking about enabling technologies rather  
48 than particularly processes that - particularly products at the end

1 of it, they're processes rather than products. Won't those  
2 processes then be available to everybody after 20 years?

3

4 PROFESSOR KING: Some of them will be. Of course, after 20 years often  
5 they're, you know, somewhat obsolete and they're no longer enabling  
6 technologies. There aren't - yeah, I mean, yes; yes, after 20  
7 years certain of these patent technologies will move, they lose  
8 patent protection and they become more available. And you often  
9 see a burst of activity around that because the suppression of  
10 competition has been lifted. But 20 years can be a long time.

11

12 DR ALLAN: But what is the alternative that the corporation that  
13 develops a technology keeps its secret? We've got the awful  
14 example in medicine we're very aware of, is the invention of the  
15 forceps that was used to save a lot of lives among women in birth  
16 was kept secret for over 30 years by a father and son team of  
17 obstetricians. And, because there was no way of patenting it and  
18 them deriving any income from it, and they actually kept it secret  
19 and you could say they had actually might have made income out of  
20 it but it led to the deaths, needlessly of a lot of women at a time  
21 when cesarean sections weren't an alternative.

22

23 PROFESSOR KING: Well, I think for every example like that there are 50  
24 examples of the other kind. Keeping - that implies that creativity  
25 is extremely narrowly distributed in human society. That only the  
26 company that has developed the secret has the capacity to develop  
27 this knowledge.

28

29 Now, when you're talking about biological knowledge or, for  
30 example, gene sequences, you know, if some company keeps the  
31 sequence of my active gene from my muscle actin, you know, I  
32 guarantee you there are 1500 researchers who will isolate the gene,  
33 determine the sequence, and some of them will publish it. So,  
34 secrecy does not prevent other people from proceeding.

35

36 Also if you're actually going to market a product, it's very hard  
37 to keep it secret because people can get access to it. So there  
38 are actually very very few examples in the literature where  
39 corporate secrecy prevented the development of the technology  
40 because the competitors just proceeded. There's a fundamental  
41 difference between a patent which allows you to keep other groups  
42 from developing the technology and a secret which doesn't share  
43 what doesn't keep other people.

44

45 I was recently at a symposium where a physician from the University  
46 of Pennsylvania described - they were trying to provide certain  
47 services, genetic screening services for their patient population  
48 and they received letters from a number of companies that owned the

1 patents on the genes charging them with infringement, right. It  
2 wasn't - if those companies had kept the technologies themselves,  
3 the University of Pennsylvania scientists would have had no problem  
4 developing it independently. So, I don't believe those are  
5 equivalent - they're not equivalent phenomena in society.

6

7 DR ALLAN: Thank you Professor King.

8

9 CHAIR: Thank you very much Professor King for joining us, our time is  
10 now run out, so we're going to close this session but we do  
11 appreciate the contribution you have made.

12

13 PROFESSOR KING: Thank you, and I look forward to reading your further  
14 deliberations.

15

16 CHAIR: Thank you very much. And likewise Dr Mittal, if you're still on  
17 the line and can hear us. [No response from Dr Mittal]. The answer  
18 to one or other of those questions is "no". Are you still there  
19 Dr Mittal?

20

21 MS MITTAL: Oh, hi; how are you?

22

23 CHAIR: Thank you very much for joining us, we've appreciated your  
24 contribution, we're just closing the session now, so we'll say  
25 goodbye to you.

26

27 MS MITTAL: Thank you very much.

28

29 CHAIR: And, thank you for the rest - to the rest of the Greenpeace  
30 team, Mr Christison; so, thank you for coming, and  
31 Professor Traavik, appreciated your contribution, and Professor  
32 Stabinsky also, and the rest of the Greenpeace team, it's been a  
33 stimulating day and we've got one or two more papers to read.

34

35 We will declare this sitting closed until next week.

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39 Hearing adjourned at 5pm

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