

## James Gregory After Dinner Discussion

### John Houghton Lecture, February 19th 2009

**Guests present:** Colin Ballantyne, Nicola Carslaw (text corrected), Dina Iordanova, Tim Mulgan, Clare Parnell, Louise Richardson, Peter Sharp, Des & Gill Smith, Brit Temby, Philip Winn  
(plus the lecture organizers, Eric Priest, Alan Torrance, Fiona Bond & Ian Church)

**Eric Priest:** We're going to record this discussion, and there'll be a transcript of it on the web. So just feel free to say whatever you'd like (laughter) - of course, you'll have chance to change anything you've said, so don't worry. Let's briefly go around the table introducing ourselves and raising questions. I'm a mathematician who uses mathematics to try to understand the Sun, so I'm interested in the effect of the Sun on the Earth. I go to a local Episcopal church and enjoy singing and climbing Scottish hills. A question is: just how accurate is the scientific understanding of global warming, because science is actually built on faith - I need faith in other scientists who have checked it.

**Alan Torrance:** I teach theology here in the University. A question I should like to raise concerns how serious you consider the risk of a runaway effect. Is it your judgment that we are approaching a point of critical mass after which little can be done to obviate an apocalyptic scenario for the human race?

**Desmond Smith:** I'm a Physicist. I'm an experimental physicist - I distrust all theories. I think Newton got it wrong, because my leisure activities, climbing mountains, skiing, and playing golf, and I'm absolutely certain Newton the gravitational story wrong because the attraction between golf-balls and water is about ten times as strong (laughter). So I therefore depend upon experiential verification in everything so I'm skeptical about the story about global warming and the effect of CO<sub>2</sub> - not that it doesn't, both John and I are Spectroscopists, we now both understand that perfectly well. No question about this, but the extent that this is the case compared with for example biological effects or the effects of the sea, worry me, and I just don't know the answers to this. And I am very concerned with the media approach to this and the politicians approach to this that assumes that it is absolutely fixed and definite - I don't believe it.

**Fiona Bond:** I'm involved in this as an advisor to the series and a media coordinator, but the rest of the time I run a business providing business planning and funding strategy advise for charities (cough obscures audio) sector. I guess my question is not necessarily one for John, maybe a wider question about the current economic situation, whether it represents an opportunity or a threat if we are looking at trying to explore alternative energy sources.

**Nicola Carslaw:** I am a journalist. I am a former BBC correspondent. For many years I was Consumer Affairs Correspondent and have also been a foreign correspondent, and in home and social affairs. In my role as a consumer affairs correspondent I reported on a variety of issues - including those that could loosely be termed "scare stories" - one of which, you could argue, is climate

change. I'm now a contributing editor for BBC News and focus on editorial compliance - impartiality and so on. My view as a journalist who works for an impartial organization is hopefully to contribute today to the debate about whether or not we should give due weight, equal weight, to both sides of the argument, to Des's side and John's side, if they should be given equal prominence in the way we report it. What sort of role does the media play in the whole reporting of the debate?

**Ian Church:** I am a first year philosophy student in the Ph.D. programme. I suppose my main interest revolves around how politics has played a role in this discussion and how politics may pose a hurdle to our finding out what our response should be.

**Tim Mulgan:** I teach in the philosophy department here at St Andrews, mainly in moral and political philosophy. My main interests are in the demandingness of morality and the question of how we balance the needs of people who are worse off than we are against our own interests and needs, and also I've been interested in intergenerational justice. And so, the question that I have about climate change is more about assuming, say, that the story John was presenting in his lecture is roughly accurate, the question is what are our obligations to these people in the future who are going to be quite likely much worse off than we are and it's a question of how much worse off we're going to make them and do we have the resources that thinking about within paradigms that have generally been more optimistic about how the future will go.

**Peter Sharp:** I'm a medical physicist from Aberdeen University. I've been waiting for 40 years for the climate to change in Aberdeen (laughter) but it still hasn't. But, I'm interested in the fact that both at the discussion after the lecture today and indeed around this table the word 'belief' has been banded around a lot, and I feel that's probably one of the most fundamental factors that we have to consider in the discussion on climate change, because so many people are either scientifically illiterate these days or even scientists like myself do not work in that particular area, and therefore how do we balance or make judgments on the evidence that is presented to us when the scientists are not providing us with an answer? They are providing us the solution that involves us doing something and us making a commitment, and so you have a combination of belief and commitment here. We've got enough theologians around the place to comment on that particular issue. It is how we take the evidence that is presented to us and are convinced that we need to act on it in a particular way.

**Brit Temby:** I teach religious studies at Bell Baxter high school in Cupar. One of the things we teach a lot about is scientific method, and I really enjoyed the references to that and also seeing scientists argue about their passionate beliefs, because in a way, it takes a lot to convince our pupils that science that doesn't have all the facts that it doesn't have all the answers and that religion is completely about faith. It is actually very refreshing to see people admitting that scientists' have lots of belief and lots of faith in different of ideas. I am a bit sceptical about anthropogenic global warming, partly because I mistrust politicians pushing something that they can raise lots of taxes in support of, but

then I also mistrust Americans wanting to justify their own use of large vehicles by denying the 'fact' of global warming.

**Colin Ballantyne:** I'm a geoscientist at St Andrews University. Amongst my research interests are paleo climate and the way that climates have changed in the relatively recent geological past, and being fairly aware of the evidence for global climate change I am definitely a convert. I believe that anthropogenic activity, particularly the emissions of greenhouse gases, are significantly altering the climate and they probably will continue to do so in the future. But my main concerns are not scientific, I think the scientific argument has been or should have been already won, my main concerns are the ways in which we can tackle this problem at the same time preserve individual liberties, preserve liberal Democracy, and preserve a market economy.

**Dina Iordanova:** I teach film studies, the rest of the time I watch films for work. If we think of recent Hollywood films there have been quite a few apocalyptic ones suggesting, for example that a new ice age will result from events to take place in Scotland in the next two weeks or something! But in a previous life I was more engaged with studies of the history of ideas, and I remember that in the early eighties I did a study on something which, back then, we called 'counter-culture' in the context of which I came across a number of books dealing with issues probably not naming it exactly 'climate change' but dealing with issues concerned precisely with what we are doing to nature - mostly thinking of the Club of Rome, in particular their report *Limits to Growth* in 1972, Charles Reich's *The Greening of America*, Theodore Roszak's *The Making of a Counter Culture*. There was a series of books published between 68 and 73 that were actually all spelling out very clearly these things that have become mainstream thinking - only back then it was really classed as 'counter-culture'. So what is interesting for me is what would have been the case if these ideas had become mainstream thinking back then because their ideas had been in circulation for quite a while.

**Phil Winn:** I have two jobs in St Andrews, both of which I think have an interesting aspect to them with regard to the sustainability debate. On the one hand, I am vice principle for learning and teaching, and one of the critical issues we have with our undergraduate students is trying to educate them in information literacy. There is an enormous amount of information available to people worldwide now a days. And being able to sift and sort that information in some rational manner that allows an individual to come to a reasoned judgment is actually very difficult, and it is a very difficult issue around sustainability, because everyone with an ax to grind, whether it's the right ax or the wrong ax, will be putting out information, all of which is accessible, and how the general public is going to deal with that information, I think, represents really quite a difficult problem.

*At that point the lights went out in the room, due to an environmental switch.*

**Desmond Smith:** Oh, the windmills have stopped (*laughter*).

**Phil Winn:** My other job is as a psychologist and as a psychologist what I am

actually interested in is the relationships between brain states and behavior. Now, I don't think neurosciences have a huge amount to offer us in sustainability, but the psychological science does. Because what psychological science will have to engage with is 'How do we change behavior?' 'What are the most effective ways to make people change what they do?' and in the sustainability debate, when we are looking at climate change, which even though in a geological sense is very proximal, in an individual life-span sense, isn't. Getting people to change their behavior, on the basis of events that may or may not occur in ways that individuals mostly cannot judge, in the next thirty, forty, fifty, sixty years, I think is really quite a difficult thing. Finding ways almost to sell sustainability on a very much more local individual "This is good for you now regardless of whether it is going to be beneficial in thirty years time!" manner I think will be quite an important trick to pull off. The importance of psychological science, I think, could be seriously undervalued in the sustainability agenda.

**Clare Parnell:** I'm a mathematician and, like Eric, I'm also a solar-physicist, and therefore, of course, I'm interested in the sun and its effects on the earth, and therefore linked with global warming. I am a believer in global warming, and there are two things, two issues I guess, associated with this. In particular, the portrayal of science, and this is actually in general not just the global warming, portrayal of science by the media, and the role the media plays in particular science stories it chooses to sell to the public or portray to the public and the way in which it does this, I think that plays a huge role in what people think, but also, as I say I believe in global warming, but even if global warming wasn't going to happen, I still think making us as a - basically as the world - a more sustainable place is important to do. And so, for that issue, yes, how do you go about persuading people that it's good to do something now that's going to have long term effects? I think that is kind of an interesting issue.

**Eric Priest:** During the three years of her Ph.D. Clare climbed all the Munros in Scotland - impressive. She also has a brother who climbed Everest.

**Louise Richardson:** I'm the Principle here and a political scientist, and my main profession of interest is in political violence, which is not immediately germane and will never be, I hope, to this subject, but my other interest is in international relations, so the particular interest of this subject is, strikes me that this is a problem for which - and I am perfectly convinced that we do indeed have a problem - for which the solutions are not national but have to be multilateral and trans-national, so I'm interested in how forge effective multilateral institutions which can help us address this problem.

**Eric Priest:** Well, what interesting questions. We could obviously keep going for several days. One starting point though is the question of the scientific case. Several of you have expressed skepticism about the scientific case for global warming. Several others are convinced about the scientific case. Then maybe we can move on to discuss questions about what are the appropriate actions, developments with the media and with other countries. But what's your reaction, John, when you hear a skeptical reaction? Are you amazed that many are still not persuaded, since you spent so many years of your life going into the

details of and you personally are very convinced.

**John Houghton:** Yes, of course, I deal with these sorts of remarks all the time from a whole variety of people, some who have vested interests and who are deniers by profession and who try to put forward arguments of whatever kind will satisfy their masters or their vested interests, whatever they are. There are people like that, who persuade themselves that there is nothing to it because that's what they want to believe and who are unwilling to do the homework required to decide on the evidence. And there are a lot of people who promote an awful lot of stuff on the web. All sorts of material that comes from the media comes from all sorts of sources, which are second-hand, third-hand and tenth-hand materials - stuff that comes from people who haven't done their homework and who don't know the evidence. They criticize the IPCC in exaggerated and sometimes very negative language without knowing the first thing about it, because they have been reading websites from people who also don't know the first thing about the issues and yet are spreading material of this kind. So, there's an awful lot out there, which sets out to persuade people that those of us who are trying to tell a story are off our heads or just 'greenies' of a kind who are trying to plug a very 'green' agenda. Because, again, we have a particular vested point of view or whatever. There's a lot of misinformation out there. And that's very hard, particularly in the United States, where this has been going on for so long - and where the best climate scientists have really worked at the issue and studied it and fed information into the IPCC system, which has been extremely valuable and very good. Some of the best modelers in the world are in the United States as also some of the best people on the observing system, who know about the basic physics, biochemistry, biology. They've failed to make their voice heard against the noise of those who've been clamoring very loudly and lobbying in that country. The impact of this has spread around the world to some degree. I seek to remind people of the things I discussed in the lecture, which is that the academies of science of all the major countries in the world are not 'greenies', they are the people who happen to be the top scientists who are running those organizations. And *they* have got together in a way that they never usually do in order to tell the world: 'We believe that although there are still all kinds of uncertainties to work out in the detail, nevertheless there's a big issue here that demands urgent action.' That is a bit of a remarkable thing for the academies of science to do. Moreover, the governments of the world, because the IPCC is an intergovernmental body, set a final meeting before any of our reports are published where the document is discussed sentence by sentence in a room full of delegates from a hundred countries. All the major countries of the world are there, with their scientists - it is generally government scientists who are involved - and sometimes they bring lawyers and other advisors. A significant number of scientists are present, forty scientists or so representing the chapter authorships of the papers. These are very hard meetings, because a lot of argument goes on - and it has to be scientific arguments that are produced not political ones. That is a very strict rule. They are scientific meetings, moreover, so if you want to change something you have got to produce scientific arguments for changing it. And, these are good meetings on the whole. It is amazing, actually, how the text has improved by people saying, 'Well, that doesn't fit with that,' and, 'that doesn't agree with that,' and, 'why are you saying this,' and, 'I

don't understand that,' and so on. These matters are hammered out within that sort of meeting - together with all its side meetings etc. These meetings, moreover, include oil states like Saudi Arabia, Kuwait, Venezuela, and so on, who make very strong representations, often from lawyers who are really trying to catch you out and, driven by their own vested interests, try to destroy the hard work and the science. It is very interesting to see the way in which the ebb and flow of the debate goes in some meetings! There are also, of course, some countries who want to be green and there are other countries who are not very green at all. But nevertheless, in the end, we have to come to a conclusion United Nations style. And every time we have succeeded in coming to agreement. The one exception was the 1995 occasion when the Saudis and Kuwait actually insisted on a footnote, but then withdrew the footnote when they were told they would be named in the footnote as those who wanted the footnote. Instead of saying, 'some countries thought that...,' they were just going to say, 'Saudi Arabia and Kuwait thought that...,' so they withdrew it at that point. So, the whole process involves going through these tough hoops in order to come to a joint statement. It involves stating what you know and what you don't know, and also trying to articulate how we perceive the probabilities, that is, explaining that 'when we say "likely" we mean so much, perhaps, sixty or seventy percent, when we say "very likely" we mean ninety percent' and so on. We try, in other words, to quantify the uncertainties. It has been a big step forward for us, actually, to do that in a disciplined way. Together with the other scientists, I'm involved in the business of agreeing what the word-use should be in any given instance. And some possibilities turn out to be not very likely at all - and so we say that what the probabilities are, we say that also. As one might expect there has been a lot of argument at that sort of level. I try to ask anybody who really pitches in and says 'what about this', 'what about that', 'you haven't thought of this', 'this can't be', 'these are too big', et cetera, et cetera, to please go and look at the study, the relevant parts of the IPCC reports, because it is all there carefully written down. Now the documents are not perfect and they do have inconsistencies in some places. Nevertheless, they do present the material in as objective a way as we could conceivably do it. And on some of the issues, I might add, some of the people's minds have been changed by means of the process of going through the arguments. I try to maintain as objective a position as I can conceivably do, but nevertheless when you find the evidence is now as strong as it appears to be, it is no use going to governments and saying, 'We're still ten percent uncertain'. Suffice it to say, when governments make decisions on economics, on uncertainties, which are enormously greater than the uncertainties we are presenting!

**Eric Priest:** So, it's basically a scientific question that we are talking about here, and you're saying that it was a very thorough analysis by the world's top climate scientists. To me an important fact is the endorsement by the Royal Society and most of the other national academies.

**Peter Sharp:** But to the average person on the street, sorry to take it down to that level, this doesn't mean a thing. I mean, they're wanting to be convinced not by the fact that a lot of very illustrious people have managed to agree on something, because there is always somebody out there who disagrees. It comes

to what Phil was getting at. It's how you get over the psychological barriers. Media, have always can always be blamed for mudding the waters on these issues anyway, but I do feel that if you stand up in front of an audience and say 'well, believe us because we're scientists', that's not good enough. But at the same time, you're up against this hurdle that people cannot or are not able do not wish to objectively look at the evidence themselves. I don't know how you get over that barrier, it's a psychological one, isn't it Phil?

**Phil Winn:** I actually think it's mildly worse than that almost, because there is a sense in which you can look at the great scientific academies, and I'm a scientist but I am not a physical scientist, but I am quite prepared to trust the big academies and go 'if that's what you say, that's fine, I believe it.' The popular image of a scientist, in mass culture, is not good. The popular image of scientists is of people who blunder around, get it wrong, release viruses, aliens, all sorts of things. You know this better than I do Dina. The general public's view of science I think is actually not very good. I think in general they think that scientists are the problem in sustainable development and not the solution. It's science and technology that's got us into the mess we're in; their not the people who are going to get us out if it. I don't believe that, but (multiple people talking at the same time obscures audio).

**Alan Torrance:** Isn't part of the problem the fact that people are not motivated to listen to scientists - that there is a subliminal motivation, indeed, to disbelieve science because the implications are so inconvenient from a lifestyle perspective? When I was young, I remember hearing smokers dismiss the warnings issued by medical scientists to the effect that smoking caused cancer because they clearly didn't want to believe the science. In short, I wonder if there is a parallel.

A further question that I think is worth contemplating concerns what options are open to us if we are indeed caught up in a particularly alarming trajectory. First year study of game theory, (non-cooperative, non-zero-sum games), exposes how difficult it is to generate the kind of scenario where people impose constraints on their own activities if they perceive that others will benefit from what you do but not place similar discipline on their own activities. In short, if there is not single authority imposing and enforcing the kind of legislation that is in everyone's collective interests, then people are unlikely to act unilaterally. In short, if it is important that we alter our lifestyles quickly, then I find myself wondering if there are grounds for optimism?

You seemed remarkably optimistic in your lecture, Sir John, but that's one major concern I have. It relates to the question raised by Phil and others. What are the chances, if this is a 'smoking causes cancer' type scenario, of our creating the necessary conditions in time...

**Eric Priest:** There's a broader problem that you've just touched on, namely, the status of scientists and their claims in society as a whole. You're saying that the general public often mocks or makes fun of scientists. That's a serious problem if it's true and I suspect that part of the reason could be that most scientist spend 99% of their time with their heads down doing their highly specialised science and not communicating the importance and philosophy of what they are doing to

the wider public. Actually, this is part of the reason why we have set up these public lectures, and it's partly why inaugural lectures are so important in the University, as means of informing people across the disciplines. In universities I think it's a real problem, St Andrews included, that we are all far too specialized and pressured and so can't spend enough time trying to understand outside our specialties. So, how do we raise the profile and status of scientists and their beliefs in society? How do we counter the fact that in films scientists are only portrayed as being crazy and unworldly?

**Peter Sharp:** I remember when we celebrated our 500th anniversary at Aberdeen, we were all asked to, sort of, do public events. My subject is, being mostly concerned with medical imaging's, very accessible to the public. Now the University's first reaction was right: You'll put on an expedition we'll have it in this particular hall in the University. And I said 'no, that's just the wrong thing.' We put it in the shopping centre, right in the middle of a shopping centre, and people saw it as part of their daily life. They didn't have to the Younger Hall or one of the other august places you have here, so you get a different spectrum of people. The people encountered it in their daily life rather than just having the motivated people coming along. And I feel this is one of our problems. Not that there aren't enough of us willing to talk about our science, but we make it too precious. We keep it cocooned in University buildings, for example, and I think the analogy can go out to the climate debate here; we can talk about Royal Societies and so on giving it impromptu, but, you know, at the end of the day that does not connect - it's a different worldview from what the people you are trying to engage. Now, it may not matter, normally, but in this debate you're trying to get people to change their habits - to insulate their homes in Aberdeen and things like this. And that's why it's even more important to try to meet them on their level. And I don't want to sound as if I am talking down to people.

**John Houghton:** Can I just briefly come in on the issue of asking people to change their habits. The misinformation lobby is constantly trying to persuade people that this awful story of global warming is going to make them live in a very different lifestyle and not really able to have this, or this or that. It's not only going to cost an awful lot of money but lose a lot of jobs in all sorts of industries, especially the oil industry and the like. However, they're also going to have to tighten their belts - they won't get all the things that they used to. Therefore, it is going to be very nasty. Now, people don't like that sort of scenario, but is that the sort of scenario that we are talking about? At the top level, our concern is changing the way we get our energy so that it doesn't come from fossil fuels, but from other means - and there are lots of ways of doing that. Technologically, this is fascinating stuff. A great many new industries will develop and make a lot of money now - all the things that happen quite normally in society. We're going to have to respond to people insisting on getting their homes better insulated, for example, in order to make them consume or produce less carbon dioxide and so on. And messing about with people's homes is going to be a bit nasty. But the government or somebody has to come in and provide incentives and help people to do it. And they'll save a lot of money because they won't be spending money on energy. So in fact, the negative side of it, from the people's point of view, is something that's been put over not by people like me or the scientists

particularly, but by those who don't want it to happen!

**Desmond Smith:** Eric, can I counter this, please? John has argued that people vested interests have gone against it. As the most skeptical person here tonight, I want to make it clear that I've no vested interest. In fact, I manufacture CO2 sensors.

**John Houghton:** Yes.

Desmond Smith: Quite the reverse, okay? But I am very concerned what John's just said because I consider government is using pseudo-science and is pushing a story that is far beyond what he is actually saying all the time, and that's what worries me.

**John Houghton:** Well, other people can come in...

**Phil Winn:** What do the media think?

**Desmond Smith:** I have a statement from John Houghton here. Apparently he's a former chairman of the Scientific Working Group of the IPCC, and one of the foremost pillars of the conventional climate change wisdom - this chap has conceded, John Houghton I believe his name is. 'When you put models together that are climate models added to impact models added to economic models, then you have to be very wary indeed of the answers you're getting and how realistic they are. The IPCC itself has described it as a cascade of uncertainty.' My complaint is that with that situation, which John has said himself, government has gone far beyond what it should.

**John Houghton:** Oh, but don't take that out of context, Des. It is entirely fair to say that when you add models together you have to be very careful with your interpretation, but that's not a statement for governments to take out of context.

**Desmond Smith:** But they have.

**John Houghton:** Well, I would disagree with that...

**Desmond Smith:** Every day we get government statements, we get press statements, we get media statements that we've got to do it and it's right and it's certain.

**Nicola Carslaw:** I think, from the media's point of view, that your argument, your report, the IPCC report, has largely won the media over. I don't think that on the whole the mainstream media need any more persuading about that, but I think what people do need persuading about is the scale of the problem and what you do about it.

Scientists have got it wrong so much in the past, over BSE for instance, we were all going to die and so beef on the bone was banned; now with obesity, we're all going to die and yet it just isn't working to tell people eat up their five fruit and veg every day. That message still hasn't got through to the very people who need

it, and I think it's going to be the same problem with climate change. Yes, they think they know that there's a problem, because they have been persuaded by you, but what do they do about it? And I think there really is that sense of helplessness, and I know that you said in your lecture that just because we don't think we can do it doesn't mean to say we should just throw up our hands into the air and say 'we can't do it.' But what should you do? Should we all get our light bulbs that are low-energy light bulbs, - when in fact they don't all fit every light? There's all sorts of everyday practical things that we are being told to do, which somebody will pour cold water on because it won't work, and so in the end you think actually, you know, 'is my little bit of recycling working or' and then you can see then there's a big report comes out saying that actually that the stuff that you're recycling there's no market for it at the moment, so what's the point?'. You know, the media want, the public actually, want a clear line and I think the problem with this story, as with so many of the other big scare stories, is that there is no clear line about what to do and how to translate the science into everyday practical solutions.

**Peter Sharp:** Does the public want a clear line or does the media want a clear line, because you just tripped over your words there and I wondered?

**Nicola Carslaw:** Well, I think the public wants a clear line and therefore the media does. The public gets the media it deserves.

(laughter)

**Peter Sharp:** That's an interesting lot!

**Nicola Carslaw:** The public gets the media it wants. After all, they don't have to buy the papers if they don't want to...Newspapers aren't going to print stories if they don't think anyone is going to read them...

**Desmond Smith:** The economists say, leave it to the market. They say government will get it wrong, leave it to the market. That's what the economists say.

**Eric Priests:** What some free market economists say.

**Colin Ballantyne:** We're surely not going to believe economists of all people.

(laughter)

**Eric Priest:** They have a bad record just now, don't they? Let's face it.

**Colin Ballantyne:** Very interesting choice of words of both Des and Nicola used down there with 'we're being told to this' 'we're being told to do that'. Actually, I think one of the problems is that we're not actually being told to do anything. All of us at the moment have individual freedom as to how much we contribute or otherwise to this problem. I think you're probably overreacting, Des, in terms of governments telling us what to do. I really haven't seen very much of that

happening. In fact, given my convictions, I'd much rather the government was far more prescriptive about what we ought to be doing - probably through taxation.

**Desmond Smith:** John has already told you that if a molecule of CO<sub>2</sub> goes into the atmosphere it stays for a hundred years, so what you're going to do is something that is going to happen in a hundred years time.

**Colin Ballantyne:** No, No, you've got that bit wrong. It starts now and it continues for a hundred years.

**Clare Parnell:** But, even if global warming doesn't exist, what is wrong with actually thinking about the world and thinking, 'well actually, there are enough things heading to extinction at the moment, and some of it is certainly to do with what we are doing.' Now whether it is global warming or not, isn't it reasonable to think about a more sustainable approach in which you halt deforestation for example.

**Desmond Smith:** Why don't you get at the fundamentals and deal with the population?

**Clare Parnell:** Well, exactly I agree! Population growth as well - that's a major issue.

**Eric Priest:** A whole raft of different global issues all have to be tackled together in an integrated way.

**Desmond Smith:** I totally agree with that.

**Clare Parnell:** So, I don't think, so much, the issues with whether it is global warming or not. I mean global warming basically means something has to happen and it has to happen very fast. What we should be thinking about this anyway, and the point of view that there is just this one Earth at the moment, okay there may be many others elsewhere in other solar systems but they're too far away to get to so we can't worry about them, so we've got to worry about this one and actually think about our children and our children's children.

**Nicola Carslaw:** But there's no clear answer as to what to do about it.

**Clare Parnell:** but insulation in a loft?

**Nicola Carslaw:** ...if you buy a Kenyan product, that's very bad for the environment, but if you don't then you're depriving the poor Kenyans of their income. So, you know, as a consumer, you're thinking of the world but actually one solution may be another person's problem in that world.

**John Houghton:** But that's the nature of the environmental...

**Nicola Carslaw:** Yes. Yeah.

**Desmond Smith:** Some would argue that it will be after this conversation.

**John Houghton:** ...some winners some losers and so on. So, you can't...

**Nicola Carslaw:** You have to then weigh up...

(audio obscured due to multiple people talking at the same time)

**John Houghton:** There are just some things that are hard to answer clearly. But there are other things that are very clear such as the ways we get our energy. This is something on which the government has to take the initiative and work together with industry. Clearly, also, the market has to be involved here too. We have to create a system which provides incentives and that makes things happen in ways that people will go along with. The general public will happily go along with new forms of energy - they don't care where their energy comes from. For instance, if LED bulbs were available on the scale that they should be or may be in due course, people should be really encouraged to use these rather than using the present ones we have. They'll get the same light out of them; better light. And it will cost them only a 10th of the electricity they would otherwise use. So there is lots of technology out there to help the thing on its way, which makes me encouraged.

**Peter Sharp:** But do we have a fundamental problem on time scale? I think Phil referred to that early on. These things are a long way away, and although we can emotionally appeal to 'this will effect your grandchildren'. At the moment, I said at the start I've been waiting forty years for climate change in Aberdeen, so, you know, to me looking to the superficial level, nothing has happened in that time. It is very difficult to get people to take action on something that is not immediately going to impact upon them. Any disasters, climatological disasters we put down to short term changes in the weather, because we have a cold winter this winter and it might be a warm winter next winter.

**John Houghton:** Talk to people who lost their relatives in that heat-wave in Europe.

**Colin Ballantyne:** Can I challenge the fact that you haven't seen climate change take place in the last forty years in Aberdeen. There many people who are around who I know who are climbers or skiers or someone interested in the mountains. Now, what have you noticed about snow cover in the last thirty to forty years?

**Eric Priest:** You certainly can't go skiing as often. It has been okay this winter, but most winters it has been much harder to ski.

**Peter Sharp:** I think ever since the ski resort has been set up in Scotland, you've had problems with skiing on them. But, no, I do believe in climate change, don't get me wrong on that one, but I do think we have a fundamental psychological problem in dealing with things that are long term.

**Colin Ballantyne:** But I also take issue with the fact that this is something long term. I mean, today's long term is tomorrow's medium term and the day after's near term. We were talking about 2020, I think, in terms of cutting carbon emissions to - I can't remember the figure Phil is it 2020 or 2030?- that is not a long way off! And when we consider the time it takes...

**Peter Sharp:** Is it?

**Colin Ballantyne:** ...to develop sources of renewable energy or even nuclear power stations. It is far too short a time scale.

**Peter Sharp:** It is to us. It is to us, but I don't know. We're talking about getting large numbers of people to change behavior, and I just feel that we're judging it as informed by large scientists or at least intellectuals.

**Colin Ballantyne:** Ah, but I think the reason why we have to consider changing behavior and morally on an individual basis is precisely because of the time scale. It will take a long time, not only to convince governments and economies to invest in alternative energy sources, to build these energy sources and put them online - we're talking about ten fifteen years minimum to get these things effective. The only short-term way in which we can effect the solution is by reduction in energy consumption.

**Eric Priest:** Yes I agree reducing energy conservation is very important.

**Colin Ballantyne:** And as we go over the per capita consumption which is so much higher in some countries in the developed world than it is in others, that must surely be possible without great intrusions on our lifestyles, so surely that is the first issue we ought to address.

**Tim Mulgan:** Can I just ask John a question, because something that struck me about what you said just before is that a lot of the time when people in the social sciences and philosophy and political philosophy in particular talk about climate change they talk about it in terms of conflicts of interest. So it's conflicts between the interests of present people and future people or the interests of people in developed countries and developing countries. Whereas you seem to be wanting to present a story where some of those conflicts don't arise; that it's not a matter of us making sacrifices for our grandchildren, but it is a matter of us doing things which are going to be good for us anyway and which are then going to be good for them. So I'm just wondering whether you really think it is mainly not a conflict situation.

**John Houghton:** There's an awful lot which is not a conflict situation. There's a fair amount, however, which could indeed generate a conflict situation if the evidence we have is correct. We believe there is very strong evidence that, for instance, droughts and floods will increase. Quite a lot of evidence we have shows increasing trends taking place at the moment, which fit the data quite well. Conflicts will tend to occur for instance in drought-ridden countries - that is, countries which are predominantly, though not entirely, in the developing

world - and how we think about them and what we should do about them. There will be millions of people displaced because they can't live there anymore, or because you've got to fly aid to them or feed them all the time. In short, the impact on such countries is bound to generate conflict of various kinds. Anticipating those problems is a very sensible thing to do. That is, we need to ask 'How are we going to cope with that?' So you need to anticipate the conflict situations that are going to materialize within the next five, ten, fifteen, twenty years.

**Nicola Carslaw:** And it's a sad fact, and an indictment of the media as well, is that when that conflict arises, then something will probably happen. You know, it seems to be that governments react when there is a conflict, and that's because react because it is reported in the media because the media like conflict stories. It's not a story if everything's the same, so they want a big development and then they'll report it and then the government throws money at it, and that's what always seems to happen. So, unfortunately...

**John Houghton:** But another part of a story that the IPCC has been studying is the problem of adaptation. Climate change impacts our models in ways we haven't take account of yet - because the earth takes time to warm up, the oceans take time to warm. So, even though we may see CO2 drop off tomorrow, we've still got climate change for the next twenty, thirty, forty years. And we will have to adapt to that. And adaptation needs preparation! There's some realization of that now but nothing like as much as is being assumed. If you see a disaster coming, you could make it much less of a disaster by preparing for it. And we should be taking that sort of thing very seriously.

**Eric Priest:** In addition to each one of us working out what we can do to save energy, what is needed is political leadership, in the form of some inspiration and ideals from government leaders.

**Peter Sharp:** Yes, it has to be international, doesn't it? What hopes are there otherwise?

**Eric Priest:** I'm wondering why it is that Gordon Brown is dragging his feet so much. Why can they not insist that the next new major coal-fired power station be fitted with carbon-capture technology?

**John Houghton:** Because it is right against their economic mindset. They say we cannot say, 'There must be carbon capture from the start.' However, they say they want to start it now or very soon because of the security of our electricity systems but that in order to put in place carbon capture and storage we have to undertake economic modeling and research to try to find the cheapest way of doing it - and that will take some time. Indeed, it may take several years, so we don't want to commit ourselves to it now. And knowing the rate at which the government machine operates, the delaying tactics which always occur, it is going to be something like ten years before we've got it! Now, looking at the overall international point of view, places like China and India are building lots of power stations. They look to the west, in particular to the U.S. and the U.K. to

take a lead. If we start putting up a power station that has carbon capture and storage, when we try to tell them they've got to get carbon capture and storage and we don't actually do it, then where's our leadership position? It's gone.

**Eric Priest:** There's a wonderful opportunity here.

**John Houghton:** And there's a psychological point there. We just can't go through all the due diligence type of economic stuff that government engages in to make ensure the best possible job get's done on whatever it may be. We've just got to get on with it and do it to show the Indians and the Chinese that we mean business, because they will be following not leading.

**Eric Priest:** We always seem to lose out in developing these different technologies for energy. In nuclear energy we lost out to the French, who were much more organised about developing it. In wind power, we lost out to the Danes and the Germans. But what about carbon capture? We have the potential, the techniques, the technology, the nous to be able to lead the world in that technology, but we must have the political will to go with them. Without that political will we will lose out to another country again.

**John Houghton:** It's not political will. Rather, it's political leadership, actually. You know, saying, 'this is a good thing to go for so let's go for it.'

**Desmond Smith:** The political will is subsidizing windmills.

**John Houghton:** The reason for that is that they have suddenly realized that the Danes have done such a good job - you can get windmills, you can put windmills up, you can start to meet some targets. They've done this by putting windmills up ...

**Phil Winn:** Could I just perhaps add two things. The point that you are raising ,Peter, about international action, I think is terribly important, but I don't think it's probably the most important thing. The notion you were just picking out there, of us, as a nation, and whether that means the UK or Scotland is neither here nor there, but taking action because it's the right thing to do for us now and offering that leadership role, I think is tremendously important. There's a hierarchy of action, there are my actions, there are the actions that go on in St Andrews, in Scotland, in the UK, that are all hierarchically built, and we all have to operate on all of those levels. To wait for international action, would be, I think, a grave error, and clearly examples your citing of what's gone on in Demark and Germany, France if you want to go nuclear power, I think is very important. But the other thing is that, it seems to me, that there is a not of optimism that one could introduce into this. It's not on the same scale, we're not talking about global climate change, anthropogenic or not. If you look back through the history of the last couple of hundred years, what you can see is, as it were, environmental disaster followed by recovery. So if you think it, when I was a boy in London we had smog. We had thick fogs that were full of soot, but clean air acts, smokeless fuels, which is a mix of political will, good economics, and legislation, and changing individual behavior, and an ability to see, individuals

could see very quickly that burning smokeless fuel actually makes a better environment, and it worked. And if you don't go back through all of the various pieces of social legislation, back to the great Victorian reforming legislation in public health, they took a bad situation and made it better, and they made it better by a combination of good science, good education, and good legislation, and we have been looking, I think, therefore, at processes of change - change for the better. Don't see that there's any reason not to be even just a little bit optimistic that actually things can be done. They can be done locally, nationally, things can get better.

**Eric Priest:** For example, John Houghton is going to give an interview on television tomorrow for the BBC politics show, where he's going to be asked the question, 'what do you think about the Scottish climate bill?'. Now, I don't know what the details of that are, but John has the potential to feed his reaction into that.

**Colin Ballantyne:** Isn't there a difference though, Phil, when you were talking about the smog in London, and I remember the fog in Glasgow, which presumably was just as bad, that was a problem that was already there. People knew it was a problem, it was causing health problems, it was causing bronchitis, it was causing fatalities, and so people could support the remedy. This is a problem, the very nature of its nebulousness if you like, is the problem; we have to actually convince people there's actually a problem.

**Eric Priest:** Yes, quite.

**John Houghton:** Nothing was done about smog until 1952, when 3,000/4,000 people died in London.

**Phil Winn:** But you can then start assigning...

**John Houghton:** But then it really began to hold.

(multiple people talking at the same time obscures audio)

**Eric Priest:** But that's what Nicola's saying -- that it is only when a disaster starts occurring it is reported, and then somebody does something about it.

**Alan Torrance:** But the problem of smog was a localized problem within a single country with a single government which was thereby in a position to legislate on the matter and deal with it effectively. Which brings us back to the game theory problem! Individuals and nations are very loath to institute costly changes that may be taken advantage of by others who won't impose similar constraints on themselves. No one likes to impose costly constraints on themselves if their effects are diluted by others resulting in a low cost-to-benefit ratio. The question is whether there is a way beyond the demoralizing factor here? Can the political sciences suggest ways of generating the kind of shared moral vision that would lead nations collectively to impose costly constraints on themselves? In short, are there ways of effecting (intra-national) legislation internationally quickly

enough to achieve what is necessary - if there does indeed turn out to be a really urgent need for it?

**Louise Richardson:** The historical examples are not auspicious on this.  
(laughter)

**Alan Torrance:** Precisely, and that's a cause of concern!

**Eric Priest:** There are two windows of opportunity there. One is the bad economic situation that we're in, because investing in future alternative carbon-neutral energy source could produce jobs as well as helping climate change. The second is the presence of Obama, which is tremendously hopeful and optimistic, so that the potential changes in American energy policy could make a major difference.

**Desmond Smith:** But unless America and China or India do something about it, everything we do won't have any effect at all, I'm afraid.

**Peter Sharp:** Somebody did raise the question when we were talking around the table about whether we are dealing with a runaway effect here. With the smog, people died and therefore we took action. This is more insidious. Are we going to reach a point whereby no matter what we do, the effects in the following years are going to be extreme, and it's going to take us a very long period to recover again. I mean, what's the model say that - if we miss the 2% target and so forth?

**John Houghton:** If you talk to James Lovelock, he believes the climate could even flip because he uses very simple models, and that we may almost be beyond the point of no return now. Two very large parts of the tropics will become virtually completely dry and desert.

**Desmond Smith:** What's his time-scale for that?

**John Houghton:** Oh, this century.

**Nicola Carslaw:** How will we know?

**John Houghton:** Well, he doesn't really know...

**Nicola Carslaw:** But, how will we know when the tipping point is?

**John Houghton:** Well, I've always tried not to play up these longer term less sure possibilities of flip-events or tipping points (or whatever people call them in the system that will turn the climate into something really horrible and nasty in some parts of the world and so on, such as turning large parts of the tropics into desert.) I spent a day together a year ago with James Lovelock at which we had great fun, but he was saying, 'Tell me, what would you say you think as a Christian?' He said, 'If by the year 2100 there were just a few of all the people we have now on earth left surviving in the polar regions, how would you feel from God's point of view?' And he was being serious. He thought that that was a

distinct possibility. Now he's a clever fellow and has an FRS and so on. But I think such suggestions are very unsure, as this is speculating on the basis of the behaviour of simple chaotic types of systems which we don't understand well. And why go to politicians with stories of that kind, saying 'Please ensure something like that doesn't happen!'. So you take out an insurance policy about something that may never happen. I'd much prefer to go to a politician and say, 'You know, I'm not going to tell you about the 1% chance of something absolutely disastrous happening, but I am going to tell you about the 90% chance of something very serious happening - I'm going to tell you about that!'. They really should take some notice of that, something that's really very likely, like the sort of thing I was talking about today, which the IPCC is describing as either 'likely' or 'very likely', that possesses a probability of actually happening of 70% to 90%. They really should take that very seriously, because that has a very high probability in political or economic terms, in comparison with the probabilities that inform the sort of decisions they are making every day...

**Desmond Smith:** Well John I think you've got a big problem because as the CO<sub>2</sub> increases you increase the agricultural produce. The productivity of agriculture will improve everywhere.

**Colin Ballantyne:** No, that doesn't quite work, because it is only certain, I can't remember which certain C<sub>3</sub> plants benefit and C<sub>4</sub> plants don't, or the other way around, but basically a lot of crops don't actually benefit directly from an increase in carbon dioxide.

**John Houghton:** That's been looked at very carefully, Des. There are some places and it may be parts of North America or parts of Northern Europe where the yields go up substantially. But if you take the average effect of our globe, almost inevitably the average goes down, because as things get warmer they don't yield so much. So you need the nutrients and you need the water and there are other things too....Now you may be able to do that in the lab or in your greenhouse when you're growing green tomatoes. It's a real effect, but all it does is play into a further game in some Northernmost parts of the world. It doesn't help people in Africa or India or Central America or places like that. So that's not very appealing - it's not a very big 'plus' in the whole scheme of things.

**Desmond Smith:** But there are advantages, aren't there, in increasing CO<sub>2</sub> as well as disadvantages.

**John Houghton:** Of course. Yes there are, but the disadvantages far outweigh the advantages.

**Eric Priest:** Well, it seems to me that we could easily go on chatting until midnight, but time is marching on, and so I want to conclude by thanking John for coming along and giving us a magnificent talk - inspiring us, informing us much better than we were before, and I, for one, will go away wanting to learn more in detail about this whole issue, and I also want to think seriously about the ways in which I personally can save energy and also can communicate to other people the importance of doing that. So, thank you most warmly.

*(Applause)*

**John Houghton:** Thank you for inviting me and for your frankness around the table tonight too.