

MR. ADLER: Most of us have been here inside all day in the air conditioning, rather than outside. As people trickle in, let me say, after this session, back in the room where we had lunch, there will be reception starting promptly at 5:00, where we will be joined by Senator Hagel, who will be sharing his views on climate change issue, and some of the thoughts that went into the Byrd-Hagel Resolution of which he is the lead co-sponsor. And that's promptly at 5:00. And that will go -- the reception will last until 7:00.

With that, let me turn this session over to Ronald Bailey. Ron, as I believe many of you know, was the first Warren Brooks Fellow at CEI in 1993, is the author of the book *Eco Scam*, and editor of the books *The True State Of The Planet*, of which -- the first edition of which is on sale out in the hallway. And we believe that a second edition will be available -- God willing, will be available some time in 1998, which you can ask Ron about after the session.

So, with no further ado, Ron Bailey.

MR. BAILEY: I'm delighted to be here. Thank you very much. This is going to be an exciting panel. I'm very pleased to be here.

I wanted to make a quick claim here. First of all, I realize that many of you have been dealing with the environmental issue for a long time, but I want to claim that I've been dealing with it for at least 27 years. It was the high school debate national topic in 1970. The question was, should we essentially have an EPA? And I've been involved with it ever since.

And on the climate change issue, just a little anecdote, when I first heard about this was when I was working at Forbes Magazine, and somebody was saying, well, they're claiming that we're going to warm up the climate, and it's going to get up to about nine degrees warmer. And I turned to the person and I said, you mean that we'll be able to have palm trees growing down Fifth Avenue in New York now? And I didn't see this was a particular problem.

But, in any case, realizing that the panel is all that stands between you and your cocktails, I'm going to move this along very, very rapidly. They will get 15 minutes a piece, and we will begin with Roger Bate, who has come a long way to speak to us. He is the director of the environment unit at the Institute of Economic Affairs and the executive director of the European Science and Environment Forum. He earned degrees in economics, land economy, environmental management from London and Cambridge Universities. He's the co-author of *Global Warming: Apocalypse or Hot Air*, 1994 -- I wonder which side he's on -- which won the Anthony Fisher International Memorial Award in 1996. He has authored numerous academic papers on science policy and economic issues, and has published articles in the *Wall Street Journal* and the *Sunday Times*. Mr. Bate has also appeared frequently on television and radio broadcasts. So here we are, Roger Bate.

(Applause.)

MR. BATE: Thank you very much, Ron. It appears I've been promoted up the batting order. I don't know if that's necessarily a benefit to you or me, or our later speakers. I've been charged with presenting a public choice perspective on the climate debate, and especially that related to science. Really, this will try and be an explanation of why rhetoric does not always equate with reality, although in some instances it does. And, in fact, it's heavily reinforced.

The reason what we have to do to understand a public choice approach is to look at the motivations, the motives behind the various actors in the debate. Dr. Spencer earlier today discussed a lot of the motivations that scientists face, and I shall dwell on those a little later. But, basically, the premise of public choice, economics public choice theory, is that most people, most of the time, cannot argue against or debate against their manifest interests.

Now, the public choice model as it applies to the public policy world is of four groups. We're looking at voters, politicians, bureaucrats and interest groups. There may be a fifth in terms of the media, which I might have mentioned but, of course, David Murray is going to talk about the media, so I probably won't.

They all want something from the political system. Voters want better government. Politicians want votes. Bureaucrats want job security and increased budgets. And interest groups want income. The climate change game, as I'm going to call it, presents all these actors vying in this game of competing interests. However, and this is a key point to all the public choice analysis, there is an asymmetry of information. Unlike the politicians, bureaucrats, interest groups, all the specialists in the field, the voters are usually ignorant of most of the details of the debates. This is true in things -- in issues like employment, but it's even more true in cases like climate change where the substance of the debate is even more difficult to define.

And, because of that, the political process gears the benefits to the other three players in the game. And this often leads to, as one economist has called it, myth making and suppression and distortion of information, stimulation of hatred and envy, and the promotion of excessive hope. And this is all in a rational game. Climate change is, as I say, a policy game like in any other. But, because of the increased voter ignorance, it's even more subject to the kind of rent seeking that occurs within most other policy arrangements.

And I assure you that when Fran Smith said that 90 percent of voters in this country were completely unaware of climate change policies, that is probably the case, certainly across the United Kingdom, and almost certainly across Western Europe. So I doubt if you go further afield than that, that you're going to have any smaller number than 90 percent.

Basically, the political entrepreneurs in this game have serious problems at home. Most politicians around the world find that they come up against a variety of problems ranging from economic policies through to things like the Whitewater scandal. At home, in my country, we have recently had the unfortunate situation of politics slipping to a discussion of sleaze, and the allegations of cash for questions asked in the House of Commons, and the unfortunate situation which we're now in where, although the Conservative Party in the United Kingdom have been in power for more time this century than the Communists were in Soviet Russia, they are probably not electable for the next nine or 10 years, given the problems that they have brought on themselves.

Where their interests, where the individual interests of the politicians coincide with the national or perceived national interest, you tend to have very, very powerful voices on this international arena. Now, remember, on the international level, politicians are less accountable for their actions. And we've witnessed recently in New York, a few weeks ago, Herr Kohl and Mr. Blair coming over here and finger-wagging rather excessively, I thought, at your president, although he seems to need some kind of finger-wagging, but probably this was the wrong issue on which it was done.

There are a couple of reasons why Mr. Blair and Herr Kohl, and Angela Merkel, the environment minister in Germany and John Gummer or rather now the new labor minister, whose name escapes me for a second -- thank you. And that's not the name of the environment minister, just a time warning. Although, I was going to be very, very impressed, Ron, if you had been able to get it to me that quickly.

The two reasons are, and it is incredibly ironic that the two countries outside of the United States that do a lot of climate scientific research are the United Kingdom and Germany, and as both our Australian guests today have already pointed out, the reasons that these two countries will be the only ones in Europe, and which certainly that hit their implied Rio commitments, it is because of the demise of the coal industry in the UK, and the reunification within Germany. And these were for reasons which had nothing to do with climate change. So, you've got politicians who can act in their own interest, who can act in the national interest, and can be seen to be green. It's a wonderful position for Herr Kohl and Mr. Blair to be in.

The other players in this game are, some of them are as obvious, business, of course. Business is not -- does not have one defining interest, though. If you're a solar power executive, you really do want climate change to be an issue. If you're an oil or a coal company executive, you'd rather it went away. And, of course, then you have the more difficult to define interest in-between, such as in financial services, and in the insurance industry, which I'm going to talk about a bit later.

And then we have the environmental organizations who can gain from the promotion of things like solar power, and from gaining kudos in pushing forward this as their agenda. And, of course, also, and this is the point that Deepak Lal I think was making, to stop population growth in less developed countries, which I actually think is the aim of quite a lot of these environmental organizations.

Then, of course, we come to the main topic that I want to talk about, which is the scientists themselves. Dr. Spencer mentioned, and when I was talking to Alan Robock earlier, that scientists on the whole do, I think, honestly search for the truth. But in my humble opinion, they are also subject to incentives. They have remained, fortunately for them, and I think with some reason, above ridicule in most countries of the world, especially in Europe. There were jokes about lawyers which go back as far as Shakespeare. There are -- doctors and accountants are being sued for malpractice even in Europe on a more regular basis than has ever occurred before. But academic scientists have remained objective, apparently objective, and above all this. And this is down to a couple of issues. One which is, of course, peer review.

Now, if you look at the climate change issue, there are many, many scientific disciplines that make it up. We took geochemistry, biochemistry, crystallography, botany, paleo-botany, there are probably 200, 300, 400 more. But most of the money, and this, as Alan pointed out to me earlier, is because it is very expensive, is heading towards dynamic modeling. Now, I would argue that one of the reasons for that is, it is not necessarily as or more scientifically important, but it is vitally important politically. It is unusual, especially in the United Kingdom, for scientists to think of their work as being relevant, but relevance is very, very useful in terms of getting dollars for research.

The Hadley Center in the United Kingdom, which is part of the UK Meteorological Office, gets about \$20 million a year and that is going up, primarily -- and it was set up because of climate change. Should climate change disappear as an issue, that government-funded body should probably wind up, although it will probably find a new mandate. The Max Planck Institute in Germany, and the University of East Anglia in the United Kingdom as well, would probably lose tens of -- maybe 20, 30, 40, even 50 researchers.

Big science needs big money, and climate change now in the UK gets more money than cancer research. Careers do depend on climate change as an issue. This, I would argue if I had longer, leads to distortions in funding, even in peer review, and there is certainly a publication bias.

There are a few documented, and probably many more, examples of scientists who are put under pressure not to stand up against the consensus. There's a nice example of an oceanographer in Miami who was told by his professor that if he questioned the climate consensus, he may be in endangering his department's funding. The more skeptical members of the meteorological office don't seem to be in charge of publicity anymore, although they were in the early stages.

And so, my point, and I haven't been able to defend it fully, is that scientists, along with the rest of the political players, have conflicting interests. And this is why rules of procedure are so important. From a constitution down to peer review, it's important that rules are adhered to. The United Nations Intergovernmental Panel on Climate Change, the IPCC, is alleged to have broken some of their own rules last year. And I'm not going to dwell on this too long, because it has been discussed at length, and I haven't the time. But it should come as no surprise that these alterations were made. If you look, and I'll quote you, from the defining article of 1988, in the setting up of the Intergovernmental Panel and Climate Change, it says that the IPCC is a mechanism aimed at providing the basis for the development of a

realistic and effective internationally accepted strategy for addressing climate change. Note the assumption that climate change was treated as a given even then.

Now, the IPCC reputation, like that of science, really hangs on the peer review process, and in open debate. Now, remember, objectivity is not from the word of a particular scientist. Objectivity arises from open debate. Now, peer review is a good case in point. There are 22 papers in Chapter 6 of the IPCC's second scientific assessment report which were not peer reviewed at the time of publication, although it is seen by the media as being a truly scientific, truly scientific in terms of all peer reviewed papers in its bibliography.

I debated John Houghton, who is the head of one of the scientific advisory groups, and he said that, "these papers were available to reviewers who could request them," but I didn't have the chance at the time, but it begs the question. Firstly, they had to know that they existed. And, secondly, that anybody in a wider potential for review were not able to get a hold of these documents.

Now, I come to, I suppose, as far as I'm concerned, the key point of my talk, and that is that there are several people around the globe who pointed these things out, including myself in the UK and Dr. John Emsley, who is a fellow director at the European Science and Environment Forum. But, especially the climate inside the climate change kind of clique and the climate change scientists, let's say, and probably the media as well in most instances, especially in Europe, reported only the complaints from industry lobby groups.

Now, one article, one comment was made in Nature at the beginning of the question about the alternations of the document, but they never returned to us, even though I tried to get through to the journalist in question on several occasions. Perhaps more worrying still is, there is a BBC program which was published -- sorry, rather which aired about three months ago, where the only reason that they actually put people on the air, including here today, Fred Singer, and Pat Michaels, was to discredit them because, at some stage in their careers, they had taken funding, or their institutes had taken funding, from fossil fuel sources. I wasn't deemed adequate, although I've been on many BBC programs, to go on that program because I'm funded by charitable sources. I did not get any funding directly from fossil fuel groups. And, because of that, I didn't go onto the program.

Now, I think that we may have had a more ad hominem debate in the United States than perhaps many people here would like to have seen, but at least you had a debate. This issue just did not raise more than a few eyebrows within the European Union countries. And that, I think, comes down to because there's a trust of -- or more of a trust of authority there than perhaps there is here.

So, quickly moving on to the kind of predictions that had been made. Firstly, that coalitions would spring up in the climate debate. The most alarming, I think, is that of between the environmental organizations and the insurance industry, especially in Europe. The insurance industry worried about potential impacts are asking for the governments to underwrite their loans. The removal of the kind of act of God areas of their contracts, increasing premiums and, of course, in return, they will say that action is needed on climate change, which becomes sweet music to green ears.

Also, it was predicted that John Galmer, who is likely to lose his seat at the election, and formerly our environment minister, would be seeking pastures new and, in fact, I think he wanted the head job at the United Nations Environment Program, until he realized he'd have to move to Nairobi. And there's one good thing to be said for Nairobi.

Public choice should also be able to help us predict things that may actually be sensible activities that may be contested by people in this room, but I think, and most economists, most interest groups, and probably most voters would agree as well, and that is the removal of subsidies to fossil fuel production around the globe. If the German miners had their funding cut, that would probably save the Vice Chancellery or whatever it is now, about 7 or 8 billion deutsche Marks a year. So, if we move on, quickly, to Kyoto, we

have heard today some very interesting analysis of countries such as Australia and the United States who have serious reservations about either continuing with the planet treaty or may be looking towards not signing at Kyoto. I urge those people to speak to the Norwegian government. Norway is a country that produces all its electricity from hydropower. Yet, it is still asked to reduce its emissions by 15 percent, as are the rest of the EU. They will find it very, very difficult. And, as I am now moving, they are shifting on their feet worrying how they can get out of this deal.

So, to conclude, the ad hominem attacks on people's funding and sources of income will continue, because I believe that a proper debate on this issue, a more open debate, would put it into better perspective. Obfuscation and myth making are flourishing. Consensus is equated with truth. Source of information is equated with quality. And, unfortunately, business is confused as to what it should do. As usual, business, when it's confronted like this, often placates. It doesn't actually attack things head on. Even now, and I may be alarming people when I say this, I think it's gone as far as -- I think many businesses have Fifth Columnists within their own companies. The environmental departments working on climate change, their jobs now depend, to a certain extent on environmental issues, and certainly on climate change.

But the debate will continue. The European Science Environment Forum, the Institute of Economic Affairs, which I represent, will attempt to keep the debate alive in Europe. Given that, my contention is, the pro- warming bias occur in funding, publication, presentation and policy, I think this is essential. There's a leaflet outside which has got a Wall Street Journal Europe article that I wrote on the Earth Summit last month, and also an announcement of our continuing debate, which is the next book, which follows up to the first book of the European Science and Environment Forum, A Global Warming Debate.

I will end it there. Thank you very much for listening. And hopefully I can answer your questions later. Thanks.

(Applause.)

MR. BAILEY: Thank you very much, Roger.

Our next speaker is going to be David Windham Murray. He's going to be talking about something, a topic, very close to my heart. He's going to give us insight into why the media seems repeatedly to raise the alarm on global warming, address whether this is due to the inherent media bias -- bias in the media -- limitations on the journalistic medium -- limitation, no -- sloppy reporting -- unthinkable -- or something else. So I'm waiting to hear what that something else is.

In any case, let me tell you, David Murray is the director of research for the Statistical Assessment Service, better known as STATS, which is a non-profit organization dedicated to improving media coverage of scientific and statistical information. He has taught at several universities, including Connecticut College, Brown University, and Brandeis University. Dr. Murray received his BS in philosophy and anthropology at Brigham Young University, his MA and Ph.D. from the University of Chicago in social and cultural anthropology. He has been widely published in scholarly journals as well as in major newspapers, radios -- spoken in radio and television formats.

Anyway, thank you, Dr. Murray.

(Applause.)

MR. MURRAY: I was hoping that was going to end soon. And thank you, Ron. Well, we've had the -- in the words, I'm batting second, in the words of Roger Bate, in baseball analogy, we've got a solid single to right. I think my job is to bunt at this point, being second here, and I probably will. I have a paper that's sitting out there. I don't know if you all got a chance to look at it. It's a more comprehensive and kind of finer textured look at some examples of media coverage regarding the global warming debate.

This was jointly authored by me and Joel Schwartz, who is now with the Hudson Institute. But I decided the other evening to sort of rewrite, and I've got a slightly different thing that I want to convey, related, but a somewhat more hovering view about what may be wrong and going on here.

I have no solutions to this, as to what exactly is driving the system of engagement between media and the science stories of this kind. But let me try to grapple with it a little bit, and try and give some examples.

Is there a problem in general with reporting global warming? During the last two years, my organization has looked at this question, investigated the possibilities, by examining both science reports and the newspaper and news magazine articles that were coincident with them. According to Ross Gelbspan, who we are told repeatedly has a Pulitzer Prize for reporting, there is a problem with media and climate change. The problem is that the handful of minor skeptics get altogether too much coverage and credibility. Geltsan, himself, meanwhile, who not only gets massive coverage, he makes news with a further claim that skeptics are dominating the media debate by pitching their campaign to "older, less educated males and younger females." Which may remind us of the famous characterization of the Christian Right by the Washington Post as poor, uneducated, and easy to command. In fact, I believe some studies of climate skeptics amongst readers have shown them to be relatively more educated than the general population.

Bud Ward, editor of the Environment Writer, explains just what it is about journalists that creates this imbalanced coverage accorded to climate minority, "skeptics have an impact disproportionate to their numbers because of the journalist's tendency to accentuate extremes so as to get both sides of the story. In this area of journalism," he concludes, "balance is the enemy of accuracy."

And yet, others argue that the coverage problem lies elsewhere. In fact, they see a pattern opposite to the one described by Gelbspan whereby the dominant media have been not only neglectful of the full story, they have actually muzzled contrary information; at the same time, they have credulously swallowed and amplified tenuous positive evidence. They perceive a one-way ratchet that shows the media more in the role of an advocate in the courtroom than as a balanced referee. Indeed, many journalists are accused of serving as prosecuting attorneys seeking always for confirmatory evidence, pairing always doubt or uncertainty where evidence fails to convict.

In many instances, reporters seem to be practicing a version of what is termed in other areas rational ignorance. Using stereotypes and prejudice as a rational response to a world overwhelming in detail or too challenging in scientific appraisal. Journalists have foreordained and awarded black hats and white hats, perhaps so as to save themselves from the trouble and the confusion that an independent evaluation on its merits each new scientific report would otherwise command from them. They have established a kind of filtering system, as we all must confronted with the complex world, which does, in part, screen the world in selective fashion.

In many respects, reporters are like trout in the media stream watching upriver for whatever tasty morsel the current will bring them. Occasionally, active foraging under a root or lily pad. Fishermen, there are many, though the sight of a hat rim over the bank's edge will probably spook the fish. The skill lies, therefore, as any good public relations officer can tell you, in knowing how to tie your flies.

How is it done? I can give you a couple of examples. Mr. Gelbspan is particularly adept at getting information that journalists both bite at, as do editors when he narrates his own. For instance, in his piece in Harper's, he opened up with a very compelling narrative sort of imagery. "After my lawn had burned away to straw last summer, I wondered, how long can we go on pretending that nothing is amiss with the world's weather." Notice the framing of this, both in immediacy, a sense of urgency, a flaming lawn, and the hint of a cover-up, how long can we go on pretending. This is extremely interesting to most journalists, and for most readers.

Another good example of how tenuous scientists become irrefutable -- oh, by the way, Mr. Gelbspan does escalate the stakes not long thereafter. In May 1995, in the Washington Post, he offers us an article, the title of which is: Should We Fear Global Plague? I mean, this is beyond the lawn now. Yes, disease is the deadliest threat of rising temperatures. So that you can always ratchet up a little higher in terms of what the threat is.

Let's look at a more careful piece of actual science that was done by researcher Camille Parmesan that appeared in Nature in August 1996. She argued that butterfly extinction within the West Coast range was possibly a function of global warming. We have greater detail of this in the other paper.

The story jumped immediately to the top of the media queue, appearing in the Guardian of England, the Rocky Mountain News, News Day, Dallas Morning News, Atlanta Journal Constitution, Lawrenceville Gazette, the Washington Post, and a 1,200 feature by William K. Stevens of the New York Times. That was actually longer than the original research article. It appeared in the Baltimore Sun, the Chicago Sun Times, and a piece in the Los Angeles Times that was entitled, Butterflies Head North to Beat the Rising Heat, Climate researchers today have found the first biological consequence of global warming as insects shift to cooler habitat. I'll leave it to better heads in here to discovery whether lepidoptera is, in fact, an insect.

Demurrals, contrary information and challenges that were sent to Nature, some of which I authored, some of which were authored by others and shared with me, were not acknowledged, nor were they published. In fact, a reviewer at Nature wrote back to me saying that the Parmesan thesis was no longer considered a viable hypothesis of global warming. And yet, they declined to publish retractions.

And yet, now we find, a year after the fact, that the butterfly extinction and global warming linkage is asserted without qualification in many aspects of the media. Bill McKibben writing the New York Times so said, and AP science writer Matt Crenson, in a July 13, 1997, special article, argued that the signs of climate change are everywhere. Birds are returning to Michigan's upper peninsula earlier to show that spring is arriving. "From Alaska to Mexico, ecologists are finding provocative signs that global warming is altering North America's flora and fauna. Vigorous tree growth is outrunning Alpine Meadows in Montana. Glaciers are melting at an alarming rate. And on the West Coast, the range of Edith's Checkerspot butterfly is gradually moving northward."

To understand the media's engagement with the story of global climate change, we need to recognize certain general features of modern media. First, the question of coverage generates a subsidiary question of whether the coverage of global warming is different in kind from the coverage of all other science stories. In general, what one finds is that certain types of science stories, of which global warming is one, get treated in approximately the same manner by the mainstream press, while the majority of science stories do not.

For example, research involving air or water pollution, endocrine disrupters, mad cow disease, silicon gel implants, deformed frogs, and food safety are often portrayed in a manner quite comparable to that of climate change issues. But other science stories, such as those involving chloride ion transport at the cell surface, or the relationship with Neanderthal to contemporary Homo Sapiens do not get this treatment.

What are, I wondered, the characteristic of stories that receive this special treatment? In general, they involved a claimed urgent threat to health or well-being, they reinforce the need for regulatory action or increased government intervention in human activities, and they are perceived to advantage one faction in partisan political disputes. Most importantly, they are stories that acquire symbolic value over and above their scientific substance. That is, one stands with respect to a particular subject, certain or uncertain, committed to action or qualified by reservations, becomes a kind of referendum regarding one's stance in some other domain, such as the political or the compassionate. To accept or reject a bit of science then, becomes a signal of what kind of person you are, and whether your motives are pure or crass.

Hence, the common maneuver on the part of antagonists is to cast stories which resort to the ad hominem. Ross Gelbspan's dismissal of climate skeptics are well-known, but sometimes researchers, and not just journalists join in. Ben Santer of Lawrence Livermore claimed that his integrity as a scientist was in question after a Wall Street Journal piece criticized his role in the IPCC document. Alternatively, Kevin Trenberth, author of a study dismissing the satellite data, has characterized skeptic Pat Michaels as being "similar to a scientist working for a tobacco company who found there was no link between smoking and cancer. Moreover, Michaels is said to have published only a couple of papers in the past five years, and they were not key papers." Journalists are attracted to this sort of thing because the notion of unmasking and finding ulterior motives is a staple of the American approach to political affairs and perhaps scientific affairs as well.

The controlling narrative that catches reporters' interests is to pitch a story involving bought lackeys confronted by white knights of the public interest. Increasingly, rather than the cogency of one's argument, the number of publications, or the prestige of a -- excuse me, rather than the cogency of one's argument, it will be the number of publications, the prestige of one's appointments held, one's political leanings, or one's funding sources that will be the focus of the journalist's inquiry. Reporters practicing their rational ignorance have learned to treat these as signs, as convenient substitutes for the task of delving into the actual scientific argument.

A reporter for the Arizona Republic summed it all up by saying, you know, I rely upon Carl Sagan, who told me, "always ask, in whose interest is it to minimize global warming concerns? The answer is that there is an industry that would be severely affected." Hence, the reporter concluded, global warming skeptics, like Arizona's own Dr. Robert Balling "should continue to be heard, but they should not be allowed to counterbalance the overwhelming consensus of scientific opinion."

Activists have learned to dismiss those whose arguments he cannot counter by attacking their integrity, thereby warning off not only other researchers, but warning off other journalists not to cover those stories, lest they offer themselves as dupes of industry propaganda. Hence -- and I'm coming to some generalizations about media, and then I'll come back to the point of blaming ourselves.

Our commonplace assumptions that the news functions as a window on the world, transmitting images from reality into headlines, is regularly belied by any careful examination of events under subsequent treatment. Rather than a purely translucent medium passing events through to the reader, news appears to operate more as combination of filter and prism. A selection is always operating in news coverage, picking out certain events in the world and ignoring others, and the ones selected for transmittal are always subject to some sort of alteration or narrative shaping until they fit. Hence, news is an active process of construction as well as a passive medium of transport.

Moreover, while we may naively expect the news to be newsworthy, that is, the presentation of something novel, we should recognize that aspect is only one dimension of what makes news worthy of selection and transmission. The other aspect has more in common with a mythos or a steady reiteration and validation that the world is just as exactly as we have always thought it should be. And today's news is best when it reconfirms us in our most deep-seated beliefs about the way things really are.

Many media analysts speak of this second aspect, the mythos dimension, by using terms like cultural template scenario, or controlling narrative. That is, by analogy, we should conceive of our cultural world as composed of certain deeply imbedded shapes and stories. Perennial tales and accounts with recognizable thought lines and character evaluations. That is, with various morals attached to how we look at the news as it's expressed. Our moral world is filled with heroes and villains, dangers and triumphs, greed and disinterested heroism, alarms and escapes, dastardly cover-ups by the powerful and heroic unmaskings, and in general plucky underdogs successfully fighting city hall. This is embedded in the American landscape.

Journalists, often refugees of humanities training in college are prime to express such narratives from reading Henry Gibson, Eugene O'Neill, Arthur Miller, or the historical examples of Galileo and the Church. They see themselves very often as in the role of Jimmy Stewart. News that alerts us to dangers, thereby demanding our attention, and that can be shaped so as to confirm the moral world we always knew, thereby commands our affirmation. This will be a sure-fire hit. Scientific stories that can be constructed into one of these templates become enduring and appealing, helping us to hold a moral referendum on a variety of seemingly unrelated issues by virtue of the stance we take on the scientific question.

The story of big tobacco, for instance, has all these dimensions with claims of health risks denied, corporate greed manipulating scientific outcomes, and crusading public defenders enlisting journalists in the good fight to rid the public of evil. Let us not forget the characterization of the journalistic business by one of Washington's most prominent publishers, the job of the journalist is to right society's wrongs.

A more important question may not be why certain stories of alarm get published, that is very likely the natural response of the medium to the world. Rather, what must be accounted for is why some stories are ignored, even studiously, given what we hear the press say about itself. In particular, we must ask why one very significant story, with all the right wrappings and colorful presentations, went unchomped by our trout. Part of the answer is that uncertainty was in this story, and that leaves us checked, particularly journalists. What do we do for tomorrow's lead if the world is uncertain. It's like turning to a weather station and hearing, the forecast today is uncertain, uncertain again tomorrow, and our five-day forecast is for continued uncertainty. We do not turn back to that station very often.

And the story to which I refer, although I'm sure the time is just about expiring here, is the story that I'm sure you're quite familiar with, the May publication by Richard Kerr in Science Magazine that was an evaluation and summarization of a lack of consensus and perhaps uncertainty with respect to the impact of global climate models. Intriguingly enough, it looked to me like a blockbuster story, and yet a Nexis search reveals how much coverage it received. In major newspapers, it received three citations. One, an article or -- excuse me -- a letter I had written to the Washington Post. One, a piece responding to Ross Gelbspan by Mr. Michaels, also in the Washington Post. And the third, an editorial in the Washington Times.

Outside of that, only one other paper, one other medium outlet in the entire country carried this story or made an allusion whatsoever to Mr. Kerr and his conclusions, and that was an extraordinarily fine piece by someone named Claire Brown, in the Bangor Daily News in Bangor, Maine. What on earth? How she got off reservation, I don't know, Claire Wood, is her name, by the way, look her up. She did a very good job with this.

In fairness to reporters, there was no new research in this article, only a summary. And yet it seemed like it appeared in a highly prestigious journal, was authored by a figure not connected with industry, yet it was effectively ignored. It does not stand-alone. I can give you probably seven other examples of a differential selective attention to relatively weak science that jumps to the top of the queue, that fits through the filter, that suddenly commands our attention, has the correct narrative shape, and four or five articles that were equally compelling from a scientific point of view, but were not conveniently cast as villains versus heroes, as industry and ulterior motives, but that cautioned or questioned the notion of certainty regarding global warming that were absolutely effectively ignored by every journalist in the country, even though they were posted on signed CyMed lines where journalists fish for upcoming stories.

Why does this happen? I don't know. And I see the time is short. Obviously, the narrative shape is lacking. You have to have this ability to tell the story in some way, and global warming advocates have done very well at that. Number two, there is a promotional machine out there, which we are all familiar with, where certain science articles get into a spin cycle by advocacy groups, by public relations groups, and by sometimes interested government parties as well.

Further, finally, this sense of prestige. Let us not forget that journalists are, likewise, going to be led by the authority and prestige of certain agencies, from the Journal of the American Medical Association Special Issue a year ago, to the use of the American Association for the Advancement of Science's meeting room with the president of the AAAS there present with Paul Ehrlich and Henry Kendall of the Union of Concerned Scientists, reporters get a message about global warming skeptics that it is easier for them to accept the authority of these scientists with their prestige standing than it is to challenge and do the hard work of foraging on their own.

We are also perhaps complicit ourselves as readers, but that's for another day. Thank you.

(Applause.)

MR. BAILEY: Thank you very much, David.

Our next speaker is going to be Robert Crandall. He's from the Brookings Institution. He's going to be talking about the political economy of environmental policy and discuss the problems that economists have in focusing on means rather than ends.

Robert Crandall is a senior fellow in the economics studies program at the Brookings Institution specializing in industrial organization, antitrust policy and regulation. He received his MA and Ph.D. in economics from Northwestern University. Dr. Crandall is a member of the American Economics Association and Phi Beta Kappa, and has written for numerous professional journals, such as the Journal of Industrial Economics, the Journal of Business, the Journal of Law and Economics. His most recent publication, co-written with Pietro Nivola, I believe, is *The Extra Mile: Rethinking Energy Policy for Automotive Transportation*. He served as a Johnson Research Fellow at the Brookings Institution, and has taught at Northwestern University, MIT, the University of Maryland, and George Washington University. Dr. Crandall was a member of the Reagan Campaign Task Force on Regulatory Policy, and has served as assistant, acting and deputy director for the Council on Wage and Price Stability.

Really, wage and price stability?

MR. CRANDALL: We got it.

MR. BAILEY: Through your efforts, no doubt. In any case, Dr. Crandall.

(Applause.)

MR. CRANDALL: Thanks, Ron. As often happens in these things, the bio is a little out of date. I come here as a student of regulation. A student, mostly, of telecommunications regulation over the last five-seven years, because that's an all encompassing sort of field of inquiry. It's so complicated and changing so rapidly. I occasionally come back to this area of environmental policy, this time global warming policy. And I appreciate Fred Smith's invitation to me, because it reminds me that there may be some areas that are even in worse shape than the telecommunications regulation is right now, which is in a total mess, by the way.

I don't know, my topic has shifted from political economy to the economics and back again. When I first was asked to do this, I guess the topic was political economy, and I started thinking, well, I remember back during the last campaign that the Chinese were funneling money into the Clinton administration, and the Clinton campaign, and that Vice President Gore was very much at the center of this, in fact, giving speeches at Buddhist temples on the West Coast. And it turns out that one of the principal proposals in the whole global warming implementation is to transfer substantial amounts of scarce capital from developed countries, namely the United States, to developing countries, namely China. As a matter of fact, some estimates have that at something like \$25 to \$50 billion a year, if we were to go ahead with that proposal. I understand that's not the proposal on the table now, but it might have been at the time.

Well, I tried to call Charlie Trie to ask him if this was really what was going on here, if these contributions were just to cement this proposal. But I was told as a telecommunications expert that the telecom system in China would have to get a lot better before I could get through to Mr. Trie who, as you may know, has retired to China for the duration of Fred Thompson's hearings.

But, apparently, I'm not going to talk just about the political economy. I'll talk a little bit about the economics. Let me just say that I do come here as a student of regulation. And if you look around the land -- the world landscape today, government intervention in markets has been discredited just about everywhere except North Korea; maybe recently France, for reasons I don't fully understand; and maybe among certain scientists advocating control of global warming, I'm not sure. But everywhere else, where you look, deregulation, liberalization, privatization is really what's taking place all over the world.

And the reason is the tremendous success that this has had. In every respect, all those markets that we've deregulated in the United States have generated benefits far in excess of even those that economists studying those industries, and who has predicted substantial benefits, would have guessed. That is, airlines, trucking, railroads, natural gas, oil, telecommunications equipment, long-distance services in telecommunications, and so forth. The benefits have simply been enormous.

The one area where we have not deregulated, and where we haven't moved -- and we've actually moved in the other direction, is health, safety and the environment. And the environmental policy is increasingly coming under pressure as being inefficiently crafted, and environmentalists are quite concerned about that and eager to enlist economists in their support in trying to do it more efficiently. And, essentially, that's what you see in the global warming debate going on today.

We saw in the 1990 Clean Air Act Amendments where a proposal to reduce SO₂ emissions by 10 million tons, I guess actually something like 8.9 million tons, as it finally worked out, stayed on the table for a period of 10 or 15 years, despite the fact that the science increasingly was pointing to the fact that there were relatively few benefits from further controls of acid rain. And, in fact, a very expensive \$500 million research project was delayed in its publication until after the Congress passed the 1990 Clean Air Act Amendments because it showed how little the benefits were from reducing SO₂ and NO_x precursors of acid rain, and because it would have hurt the cause for the acid rain program.

But, in order to get support for the acid rain program, the environmentalists sought the economists who told them, if you simply went away from your command and control regulation, particularly bearing down on new sources, new fossil fuel burning sources, and allowed tradable emission permits, you could do it much more cheaply and, in fact, you could do it at maybe a fifth of the cost of what it would otherwise have cost. It wouldn't cost \$5 billion a year, but might only cost \$1 billion, maybe \$2 billion a year. And, as a result, the entire package passed.

But one might ask the question, if the economists hadn't been co-opted into this game, might we not have gotten the acid rain control program in the first place, or maybe even the entire Clean Air Act of 1990, which I think we will find out down the road was a disaster. That is, it generated much more in the way of costs than in benefit.

Most recently, further evidence of the way environmental policy is going is provided by the most recent decision by the Environmental Protection Agency on tightening down the national ambient air quality standards for photochemical smog, ozone, and fine particulate matter. Even EPA's own assessment showed that the benefits from tightening down the photochemical smog standard, that which we heard about earlier today, about being able to see across the Potomac, the benefits were close to zero, and certainly much less than the costs. Yet, EPA went ahead and promulgated this standard, and tied it in with the fine particulate standard because there is some time series evidence and some cross-sectional evidence, epidemiological evidence, that mortality seems to be correlated with the level of particulates and

fine particles. Apparently, must be only with people who are near death's door who have a severe respiratory/circulatory disease.

Now, no one really knows what it is, and people are honestly searching this, whether most of the benefits are in the form of people who are aged and have severe circulatory/respiratory problems, but no one would argue that the benefits would redound much to children, and yet in the press release which accompanied, and the press conference which President Clinton had which accompanied the release of these standards, it was defined as a pro-children event, as a result of one study that had been leaked to the press which somehow linked some malady of the infant death syndrome of children to air pollution through some strange bit of analysis.

Well, the global warming debate is simply a continuation of a lot of these environmental policies. And what I'm struck by, as I look at this issue occasionally and talk to my friends about it, is how ideological it is. I can almost every time predict what a person's leaning -- and most of my colleagues at Brookings would be in favor of doing something. They are slightly to the left of center. If you get people who are far to the left of the center, from the environmentalist movements, they'd be in favor of doing something 10 years ago, but certainly doing something today, and much more than perhaps my colleagues at Brookings would do. My conservative friends, many of whom are in this audience today, would be in favor of doing very little. It is clearly an ideological issue. I guess the exception is that if you're a member of the left who represents coal workers, you have a different point of view.

But, for people who are eager to seek new interventionist government policies, this is a panacea in many ways. Think about the number of programs that have crashed around the ears of the interventionists. I go back to the -- all of the energy policies that followed the first Arab oil embargo, and the first OPEC I. Think about all the things we did because the predictions were, if we didn't do something, the price of oil was going to soar to \$50 or \$100 a barrel, that's in those dollars. Today, you'd have to multiply that by three-and-a-half or four times. We got oil price regulation, we got crude oil entitlements which transferred wealth from U.S. oil producers to Arab oil producers. We got gasoline rationing by day of the week, remember that? We got subsidies for Northern California windmills, most of which as I drive by them today are still. We got CAFE standards, which might have saved a few gallons of gasoline at a substantial cost to human lives.

By the way, when I first published some research on that in 1989, the Department of Transportation said, ah, the evidence isn't clear on this at all. We've got to go ahead and tighten down fuel economy standards for automobiles. It's not clear that smaller cars kill. Just in the last few months, the Department of Transportation released a study confirming the fact, yes, smaller cars do kill.

All of these things we got because we were fearful that the price of oil was going to soar. We were running out of fossil fuels. Well, we know that many of us at the time suspected that was incorrect, and argued that it was incorrect. And we know what has happened since then. But, unfortunately, this is a heads, I win, tails, you lose, argument from the environmentalists, because now, because oil prices have collapsed so low and, in real terms, are quite low, therefore we consume far too much fossil fuel and, therefore, we are endangering global climate with the generation of so much carbon dioxide. And, as a result, we need to trot out all of the old arguments, all of the old approaches to controlling CO₂, building efficiency standards, appliance efficiency standards, and so forth.

Well, I think many people understand that that dog won't hunt. That we know that this type of regulation doesn't work and, as a result, once again, the economists have been dragged in. And my colleagues have signed a statement, many of them in the profession have signed a statement saying, we know how to do this. Given that global warming seems to be a real problem, we can help you in how to control it efficiently, and we'll either do it through carbon taxes -- well, we know how far carbon taxes will get while Senator Byrd is still in the Senate, so we'll have to come off that -- or we'll do transferable permits. And the efficient form of transferable permits, any economist will tell you, is one in which the developed countries who have more energy efficient technologies, buy permits from those in developing countries,

which have energy inefficient technologies, in order to get them to reduce their emissions, employ more efficient energy use and energy using technologies, and save on energy per unit of GDP.

The transfers I mentioned earlier could be, my colleagues estimate -- by the way, there's an interesting piece to read on this. I agree with them on most everything, though they would do something very minor, Warwick McKibbin and Peter Wilcoxon have a policy brief released by Brookings. This is a professor economics from Australia National University, and a professor of economics, University of Texas at Austin, in which they argue that at global emission trading policy would be a disaster. It would cause enormous flows from North to South, or from developed to developing countries, create tremendous pressures on currencies, and lead to trade protectionist arguments, and all the sorts of things we were familiar with in the 1970s and 1980s. Rather, they would argue, what we ought to do is something minimal within each country, and that is a carbon tax, again, a non-starter, or some limited form of emissions trading program.

Well, I'm afraid that, as economists, we often get sucked into these debates not asking the right questions. The right question in every one of these cases, in the acid rain question was, should we do it at all? I mean, should we have done it at all, even if we could get the costs of acid rain abatement down to a billion dollars a year, given what we knew then. Today, the environmentalists will come back and say, a-ha, now we know today that controlling SOX and NOX leads to a reduction in fine particles in the air, and as a result we have these recent studies which are very controversial about the health effects of acid sulfates and these nitrates in the air, and as a result maybe we should have done it all along. But, at the time when this debate was transpiring in 1990, the expert group, the NAPAP group, had said that the benefits were really very small. The former director of that organization suggested they were, I think, somewhere on the order of 400 or 500 million dollars a year, far less than even the efficient cost to control.

The same thing could be said about the global warming debates. Consider that right now one of the most important issues facing the world, and it relates to what Ben Wattenberg was talking about earlier, is how we solve the problems of aging and slow population growth. How do we fund a whole bunch of health and pension programs given the slow down of population growth and an aging of the population? And the answer is, we have to maintain GDP growth and increase the savings rate.

As I was walking out of my building today, I ran past a paper produced by two of my colleagues looking at alternative approaches to increase the savings rate by 1 or 2 percentage points. And they were anguishing over how difficult that is to do. Yet, the notion of just stabilizing global emissions would cost us 1 or 2 percent of GDP every year from now on out into eternity according to sort of the centrist estimates, and the benefits sometime 30, 40, 50 years, depending on what the models tell us, might be somewhere between 1 and 1-1/2 percent of GDP a year for the United States.

As a result, given that you have to discount future benefits, the costs greatly overwhelm the benefits, and not only that, but these are going to be costs which are going to reduce the rate of GDP growth, are going to make it more difficult to generate the savings for all the programs we want to keep going, improving education, funding pensions, funding elderly health care, and so and so forth.

The economists, it seems to me, ought to ask those people who say we have to do something today, to show us, and they've got to give us estimates, of how much it costs to wait. We know what 1 percent of GDP is, we can multiply .01 by GDP. We know what that can generate, given what the rate of return on capital is, which, by the way, because we don't invest and save enough, according to particularly more left leaning members of my profession, is we don't invest and save enough and, therefore, the rate of return on capital is higher than it should be. We know what that rate of return is. We know much it costs. You know, 1 percent of GDP today is \$70 billion a year.

What the advocates of doing something today have to show is that waiting one day, one week, one month, one year, is going to generate an increase in the cost of doing something if we discover that the adverse effects are worse than we had imagined. Then, the costs of moving today, because the cost of moving

today is forever to lose that 1 to 2 percent of GDP. And that's really the question the economists ought to be putting to those people who advocate doing something about the global warming problem, rather than being conscripted into the army of interventionists. For those people who think that once you put into the political machine, that out of it comes something efficient, something in the way economists would design the ideal emission trading or tax system, I think they've been smoking something.

Thank you very much.

(Applause.)

MR. BAILEY: Thank you very much.

Just, I have to mention one thing, when you were talking about predictions, I happen to be looking back at the Global 2000 report that President Carter's Council on Economic Quality issued -- I think it was, what, the Council on Environmental Quality issued, and in 1980, they predicted that world food prices in real terms would be up 100 percent by the end of this decade, the year 2000, and that energy prices would be up 150 percent by that time period. And it just shows to me what we can do with the predictive models that the economists and other people come up with.

MR. CRANDALL: Wait, there are no economists on the Council of Environmental Quality. I resent that.

MR. BAILEY: Well, presumably, they were quoting people.

In any case, our next speaker has also come a great distance to be here. He's going to be talking about the precautionary principle. Something which we've heard a great deal about earlier on. And he is probably one of the world's leading experts and critics of the precautionary principle. Wilfred Beckerman is emeritus fellow at Balliol College, University of Oxford, and author of *Through Green-Colored Glasses: Environmentalism Reconsidered*. He has authored several other books and articles which have appeared in such publications as the *Economic Journal* and the *Review of Economic Studies*.

Dr. Beckerman received his BA, MA, and PHD from Trinity College, Cambridge. He has been a member of the Scientific Advisory Group of the School of Environmental Sciences at the University of East Anglia since 1990. He has also served as the chairman of the department of the Environment's Advisory Panel for Academic Economists from 1992 through 1996.

Please welcome Wilfred Beckerman.

(Applause.)

MR. BECKERMAN: Thank you.

Well, it's obvious that I'm not so well known here as I am back home. When I stand up to speak, nobody walks out. (Laughter.) Or started throwing tomatoes at me. Although, I was a bit alarmed during the lunch break. Some of you may have heard some announcement about the fire has been put out. I thought, oh, my God, my enemies have got to me even here, trying to set fire to the building I'm in. So it's very -- as a result of this, I'm being reduced to going further and further afield, traveling through more and more climate zones in order to be able to speak in peace and security.

Last year, I was twice in Australia, and where the average temperature was about 8 degrees Centigrade higher than it is in Oxford where I live, and everybody seemed very happy there, and the place was prosperous, and people were confident. And so, for the reasons I was giving earlier, I can't get very excited about the speed of change of the climate as far as I'm concerned.

Anyway, as you know, the buzzwords today, have been one for the last few years, have been sustainable development, and the precautionary principle. I have set out elsewhere, in some detail, various places, why I think that the sustainable development concept is either meaningless, muddled rubbish or, if it means anything, it's pernicious, and I don't intend to repeat my views on that here where I'm supposed to be concentrating on the precautionary principle, the precautionary principle in relation to climate change.

Now, of course, one of the basic issues at the heart of this precautionary principle argument is the uncertainty, including the scientific uncertainty about which we've heard a lot today. I'm not going to discuss the scientific uncertainties, not because I'm not a scientist, because I couldn't afford to let it get back to my colleagues in Oxford that I was reluctant to talk about something merely because I knew nothing about it. I'm going to skip the science because other people here, who are much better qualified, have been talking about it today, and I'm sure we'll all come to the conclusion, there are a lot of uncertainties. As an economist, I'm better qualified to talk about the economic impact of climate change, and also about the theory of choice, insofar as there is one, faced with uncertainty.

Now, on the economic impact, there are, of course, lots of complicated models showing the long-range economic impacts. Given the failures of economists to predict in the last few years the strength and duration of American economic growth, the depth of the German recession, the monetary turmoil in Europe, and many other things, nobody believes that economists are very good at predicting anything in the short-run, and it's a very dangerous activity. So, what you have to do, two big rules of predicting economic effects of anything, one, predict at least 50, preferably 100 years ahead, then nobody will know if you've got it right or wrong. If any graduate student in 100 years time finds out you made a mistake, it will make no difference to your career. You won't care a damn.

Secondly, of course, any old fool could cook up predictions for 100 years ahead. The second key is, it must be a big computerized model which involves enormous resources and costs a few million dollars. You know, a nice intersectoral, inter-country, inter-planetary, optimizing, dynamic, equilibrium model. That way, you can go to a grant giving institution, and you can get a couple of million dollars for it, because, you know, the main *raison d'être* of people in grant giving institutions, the way they get promoted and big offices and all that, is to give out more money, and so that you help them.

Whereas, you see, I'm now going to put up my little model, which I just did in a couple of minutes outside, during the coffee break, and I estimated that, charging a fee like the one that lawyers or psychiatrists charge in this country, I ought to charge about \$2 for it. So perhaps you could put it up, if you would light it up. Well, it's not very clear. If we turn down some of the lights. Yes.

I haven't got Pat Michael's wonderful gadget. But, anyway, it doesn't matter. You see, along the bottom, the horizontal axis, is temperature divided into, say, from minus 18, a zone of minus 18 to 15 down the bottom, and plus 25-27 down the bottom on the extreme right-hand end. These are climate zones, three degree bands. Over here, the actual research going behind this, I did it taking the coldest winter months in each country, and the vertical axis, I had the number of people living in those climate bands. You see, what was the population size.

Now, I've smoothed the curve a bit, but it was something like that. You see, you've got hardly anybody lives down there where it's very, very cold on the left here. The only people you find there are television teams making films of polar bears, or something. And hardly anybody lives right up the top there on the right. You see, most people sort of spill over the vast range. In other words, it's obvious that the human race is not some fragile artifact that could only exist in a little band of plus or minus two degrees like something in a museum. You know, people -- it wasn't correlated with income per head either.

Now, what happens if the average temperature rises three degrees, say? Everybody will be in a higher band, you see. So, in other words, you move the curve to the right a little bit, okay. Now, this means that the people who were over on left there, they're slight better off. They've moved to slightly warmer. It was very cold before they moved to slightly warmer. And the people who are over on the right, the extreme

right, they're worse off, they've become even hotter, and it was pretty hot already. But, of course, only if they're very stupid will they stay there. They will probably move back. So, on balance, it's quite obvious that the world will be slightly better off.

Now, I agree, if I wrote to some grant giving institution saying, I've got a model which will tell you the economic effects and show that it can't really be very serious and I will charge you, no, maybe not \$2, I'll make a profit, \$500. They would all laugh their heads off and say, you know, who is this poor schlemiel Beckerman, he wants \$500 for a grant. Completely useless, it's a waste of my time applying for them.

So, of course, I know that there are various qualifications to this, various simplifying assumptions I've made. Temperature isn't the only thing that matters, rainfall is important, but we all know that the one thing these climate models do agree on is, it's going to rain a bit more. Now, Murphy's Law will no doubt operate, and all the rain will come down where I live. But you can't be sure about that, it might be distributed around. Some places might be actually be beneficial.

Another factor is, you know, there's mentioned, Alan mentioned, is speed of change. Well, I've already given my view about speed of change. And, I mean, Tom Schelling gave a wonderful talk about this a few years ago, talking about, you know, the way millions of people migrated across climate zones, Vandals, Gauls, Italians from Sicily moved up to Boston, people from the Northern states of America moved down to the Southern states. You know, people migrated through vast climate changes even before they had the technology to adapt, which we do now. So I don't think that one should worry too much about the speed either.

Thirdly, a reference was already made this morning to the fact that the sector that really matters is agriculture. And for reasons which other people have mentioned this morning, agriculture, on balance, is not quite clear which way it's going to go. Some areas will be -- will find the climate change beneficials, others will find it worse, and that sort of thing has gone on throughout human history. There are all sorts of reasons which make some area's comparative advantage get better, and other areas comparative advantage get worse. And it doesn't happen overnight anyway.

So, let me get on to, as I have 10 minutes left, to what I was supposed to talk about, which is the precautionary principle. Now, people will say, well, that's all right, yes, okay. We can switch off the model. And I don't need to keep it. I can do it again any time you'd like. People will say, yes, well, that's all very well, but there's this uncertainty. You can't be sure. There might be some terrible positive feedbacks, and there might be a catastrophe, a real catastrophe. And so, shouldn't we do something just in case there's a terrible catastrophe. Well, you see, the problem is that nobody in their senses, nobody behaves that way in their lives, you see.

A few years ago, some Chinese satellite was out of control and was orbiting, and was going to come down. And apparently it wasn't going to burn up, it was going to come down solid. So, if it hit you on the head, it would be a catastrophe, irreversible. How many of you spent your time down the subway station during the day when we knew that it was going to land? Mind you, of course, that the Washington subway station might be even more dangerous than staying out the top, I don't know. But, you see, nobody behaves that way. If you were prepared to incur any costs because of the possibility, however remote, of a catastrophe, however great, well, you might as well commit suicide straight away. You couldn't go out on the street. You couldn't stay at home. Nothing. I mean, it's just not rational.

The point is that there is no rational theory, there is no theory of rational choice under conditions of pure uncertainty. There's a nice well-established theory in economics of rational choice under conditions of risk. There's a lot of game theory about choice where you don't know how your opponents or your competitors are going to operate. But there is no proper theory of rational choice under conditions of uncertainty. When I say no proper theory, no theory that gives you a nice simple paradigm where you can work out what you have to do. Because pure uncertainty is exactly the same conceptually as total incommensurability. Some things are incommensurable. It's like trying to say, can I have a theory that

will tell me whether Tintoretto is a better painter than Giovanni Bellini, or Picasso is better than Matisse. There isn't any way you can quantify it because they are not commensurate with each other in a quantifiable way.

But, nevertheless, we're faced with choices between incommensurates every day in our lives, and we make them. How do we do it? We make them because we -- partly, because, according to our tastes, our preferences, somebody mentioned that ideology comes into it, and partly on the basis of the strength of the different arguments. It's an error to think that you can only choose Option A rather than Option B, if you can find an argument for Option A which defeats the argument for Option B, or refutes the case for Option B, that's a mistake. You would never make decisions if you thought you were bound by this sort of decision rule.

What you do in the end is, you take decisions in favor of an option for which there is an undefeated reason. Not a reason that defeats all the other reasons, for which there's an undefeated reason, and the light of the strength of the arguments, how appropriate the arguments are, so that in the case of global warming, this is what you have to do.

And there are several strong arguments why you should not rush ahead with any drastic action on the grounds of this so-called "precautionary principle." First, mention has been made this morning that there's a lot of research being done into the uncertainties, the scientific uncertainties, and maybe, as time goes by, we'll know a little bit more about them.

Secondly, there is a lot of technological progress in development of substitutes for fossil fuels, in spite of what somebody said this morning, on the whole, the prices of the substitutes have been coming down relatively to other costs, not necessarily to the costs of fossil fuels, but to other costs. And it's quite likely that this will continue. So that it's quite likely that in a few years time, if you find that you do need to start some action, the costs of switching to substitutes will be much less.

Thirdly, if you take drastic action, it's a bit like these stories that a lot of the environmentalists cook up about the terrible effects of running out of some raw material. Now, of course, if you woke up tomorrow and found the world had suddenly been deprived of some crucial raw material, it would be catastrophic. But it doesn't happen like that outside science fiction. These things happen slowly. And the same principle applies here. If you want to do -- if you find that you have to take some action to reduce global warming and the burning of fossil fuels, if you do it smoothly, slowly, over time, there will be much more adjustment, and consequently much less costly action than if you take the sort of drastic action of quantitative restrictions that are being called for by many leading politicians, including, I'm afraid to say, my own prime minister a couple of weeks ago.

Fourthly, drastic, quick action invariably means the most expensive sort of action, because it will mean quantitative restrictions of the sort, again, that Mr. Blair and others have been calling for in the last few weeks. That's the action which looks as if it's going to give quick results. If everybody cuts their emissions by 10 percent, 20 percent, that's the way to get something done quickly. Whereas, of course, as somebody has already said, what you really need, if anything, if anything -- and I emphasize, if anything -- is some sort of international tradable permit system which will need to be preceded by a very, very long negotiation. It's a very tricky business. I doubt whether they will ever get an agreement in the end. But at least that's the way people should be moving, rather than rushing into some sort of drastic action.

My final point is, one or two people, especially my old friend and ex-colleague, Deepak Lal, and one or two other people, have mentioned the environmentalist claim or posture, and some politicians, of occupying the moral high ground over this. Now, I think this is an absolute travesty of the truth. There is no ethical force whatsoever behind a move which will impose heavy burdens on the world today in order to spare future generations in 50, 100 years time, a small cut in their living standards, when those people will be incomparably richer on any modest assumptions about growth rates, when those people will be incomparably richer than the people are today.

I mean, for example, in countries like in China, they will probably be 10 times as rich in 100 years time, maybe 20 times as rich. Why should one impose sacrifices, particularly on those refusing to aid Chinese today, in the interests of their descendants in 100 years time, who will be 100 years richer. I mean it's a sort of inverse ancestor worship, the irony of which I'm sure will not be lost on the Chinese. (Laughter.) If you really wanted to claim the moral high ground, and you wanted to follow a policy of minimizing poverty and suffering, the best policy you should adopt would be to promote -- help promote throughout the world societies characterized by respect for human rights, and individual freedom, and freedom and respect for human rights are not scarce, fixed, finite resources that have to be shared out over generations. And the way you can start in bequeathing better and more decent societies through future generations is to start doing it now and there are enough plots in the world where you could start doing it now.

So, whilst I'm not saying you shouldn't take any interest in global warming, I think there are some things you could do, certain no regret policies, I think that one should try to tone down all the excitement about it, and above all, if you want to have a moral crusade, try to get your priorities right.

Thank you.

The Senator is on his way here and that he would like to address us here because he's going to have to run back to Capitol Hill to vote on something or other, of no doubt great national import. So, while we're waiting for the Senator, why don't we take a few questions for the panel?

They've stunned you to silence. You've agreed with everything they've said? Okay. Of course not Fred's -

David, you made the very excellent points about the difficulty of trying to communicate the message of rationality and logic in this sort of noisy rational ignorance world and yet the observations you made told us how to develop the filters and so on. And we certainly have heard comments from the other panelists and earlier on today about how one might craft a program with intellectual content, emotional content, that would supposedly meet those filters. There are very bright people advising American industry and world industry and yet I would argue to date the success of industrialists around the world in getting their stories through has been de minimis. Why is it that - are we doomed to be stupid or is there something we're doing that we could maybe improve upon?

MR. MURRAY: Improve upon devices for getting a message through and so forth? I mean, obviously owning a few newspapers and a few movie theaters and television stations would be a useful implement for getting messages out. And my impression is that a large number of Americans actually, in their default setting, are quite receptive to general models of economic competitiveness and liberation and the value of the marketplace and so forth, so that there is a disconnect between what we might have as a system of values here and what the American people expect as opposed to what it is we're regularly perceiving in the dominant media.

But I do think that the moral battle is a problematic one, that many reporters have come to the conclusion, abetted by other elite institutions in our society, that suggest that the corporate message is inherently suspect and until experience teaches otherwise, that the absence of the corporate world may turn out to provide such a negative duress in our lives that we begin to sequence again for those things which were products of affluence and our ability to provide for ourselves. Until we come to that sort of 'bottoming out' of actual sacrifice and loss to see the costs of some of our ignorance and our neglect of the kinds of choices that we're making, until all those things are actually brought home experientially, I don't see how assuaging rational argumentation or even narrative images that are done in an advertising campaign will be able to penetrate. My impression is it's going to have to be experiential teaching. I think we simply too much take for granted the affluent world into which we were born for us to really wonder upon what it is based and are we perhaps corroding it by the choices we've made in the regulatory system.

I don't have good image devices, other than, sure, tell stories, get victims, throw narratives, throw difficulties, get good punch lines. And yet this doesn't seem to be really -- the core of the matter is convincing people rationally by evidence and the emotional arguments and, you know, red flags really seem to be counter-productive in that regard. I don't have much strength in terms of what can be done differently, but here to entertain - I know that you probably have some ideas in this regard, Fred.

MR. : I see that the senator's here, so if you'll join me in thanking the panel for being here, speaking with us. Thank you.