

that on hybrid embryos which panders to fears about 'Frankenstein' creations, is little more than 'hysteria' on the part of some sections of the media.

"The British people are not stupid – unfortunately our media leaders would think that they are sometimes.

"Frankenstein's monster was something alive, and there is no possible interpretation you can argue that is being done in this case" he asserts, referring to hybrid embryo research. "It is just not helpful. Dialogue needs truthful evidence and information which is verifiable."

On a more positive note, he cites the vast amounts of responsible

newspaper coverage of the issue, ranging from features to articles in science columns.

Looking back, Lord Winston pinpoints the moment he believes science attracted criticism and became something to be suspicious of: "The watershed in history of all this for me was the development of nuclear weapons. In the 1930s the then government decided what we were doing with the nuclear programme was so powerful it had to be kept secret – even from some members of the Cabinet.

"A lot of scientists showed their misgivings, and a lot wanted to come

off it (the programme). Until that time, it was assumed that science was good. In the last two to three decades there was then the notion, articulated by C P Snow, that of the two cultures, science was hard edged and threatening, while the arts were touchy feely and cuddly."

Lord Winston wants to dispel that viewpoint: "In my view science and the arts are the same thing, expressions of the same part of human aspiration generally."

It is a message he aims to share with as wide an audience as he possibly can.

BOOK REVIEW

An Appeal to Reason: A Cool Look at Global Warming

By Nigel Lawson

Duckworth Overlook £9.99, pp149

After his tremendous career on the Financial Times, as Secretary of State for Energy and as Chancellor of the Exchequer, Nigel Lawson is now bringing his perspectives of journalism, economics, energy policy and politics to the issues of climate change. His book is a strongly argued, but unbalanced attack both on scientific research into climate change and on the plans of governments to moderate global warming by reducing carbon emissions. The heart of his case is a disbelief in the scientific predictions about the natural and human consequences associated with the rise in atmospheric temperatures over this century of about 4°C. Nor is he convinced about the policies proposed to deal with these effects.

These policies as well as the scientific, economic and administrative procedures being used are broadly similar to those that environmental scientists, campaigners and governments developed over the past 50 years to deal with urban smog, acid rain, lead in petrol, asbestos, stratospheric ozone depletion and water pollution, etc. With the progress that has been made towards these environmental objectives the international community is confident that they will be able to deal with the more complex problems of long term climate change caused by human activities.

The book seriously understates these problems, based on a selective review of scientific observations of the natural world. These changes are more substantial and have been occurring more rapidly than any others since about 10,000 years ago when huge ice sheets covering Britain were melting along the Thames. The largest temperature rise of 3°C in the last 50 years has been on the Antarctic peninsula, where recently large ice sheets the size of Wales

and at least 20,000 years old broke away and initiated further slippage – 'the cork popping out of the bottle'.

Economists are more gloomy about forecasting than meteorologists – as I have learnt from Professor Lord Desai. So it is not surprising that Lord Lawson doubts whether it is possible to predict how climatic changes will develop and whether there is anything we can usefully do to arrest them. The evidence so far about predictions and about whether political responses are possible does not support this pessimism.

Arrhenius' nineteenth century predictions have been confirmed by the steady rise of CO₂ concentration (which will nearly double the pre-industrial levels in the next 20-30 years), and by satellite measurements of the reduced out-going radiation and lower temperatures in the stratosphere.

However Lord Lawson is quite correct to point out the difficulty in predicting the rise in temperature in the lower atmosphere and near the surface, though Arrhenius' estimate of 5°C may be only a slight overestimate. But as an economist living in a glass house he should not throw stones at the methodology of incremental improvements in modelling, which he unjustifiably ridicules by appealing to the philosopher Sir Karl Popper.

This approach (explained by Popper's student Lakatos) is proving successful in the continual reduction of the uncertainty of climate science, as John Mitchell successfully showed in the 1990s when the effects of industrial aerosols were introduced into the Hadley Centre climate model.

Although the book criticises the use of climate data and its interpretation by the Intergovernmental Panel on Climate Change, and by Al Gore in his movie, it actually agrees with the official conclusion that the average temperature over each century was always at least 0.8°C lower than its present value; in other words we really have a warmer climate now.

More controversially the book does not accept the usual explanations about the trend of the global average yearly temperature in the past 50 years. One should recall that until the 1990s, it was generally assumed that global warming would not be detectable until about 2010-2020 because of the natural climate fluctuations that can last over many years and even decades. However when the annual global temperature rose sharply in the late 1990s, many climate scientists regarded this trend as clear evidence that human activities were already causing significant global warming, and indeed at a more rapid rate than had been expected. But since 1998, as the book makes clear, this average temperature, which covers both land and sea areas, has not risen further, which has confused engineers and others making long term policies and investment decisions.

In fact over the period 1998-2008 the average surface temperature of the ocean has decreased. Nevertheless, because of the underlying green house effect, the temperature over all the land areas has continued to rise, currently (according to NASA) at the rate of about 0.15°C per decade.

In other words natural or man-made climate trends cannot be understood without considering the chaotic variations, lasting over many years, both in the temperature over the surface of the oceans and to a lesser extent over the land areas. Since global climate models describe these broad features, they are valid for predicting global temperatures over periods of decades and centuries.

The greatest dangers associated with climate change will be extreme weather events and changing processes in the atmosphere and ocean, and on the land. But Lord Lawson is sceptical and underplays the danger of future climate change by describing it as simply a slow rise in temperature (which he does accept).

The critique developed in the economics chapters of the book are based on this optimistic assumption. He urges governments to disregard the economic analysis and scientific reviews of Lord Stern which concluded that a modest (about 1-2% of GDP), but urgent, increase in public and private investment is needed to accelerate both energy conservation measures and market-driven low carbon technologies.

When it comes to an analysis of the non-governmental financial structures to enable the market to promote these measures, he calls the market-based, but government supported system of carbon credits, cap and trade, and the Clean Development Mechanism (CDM) a 'scam'.

Having rejected these incentive arrangements, Lord Lawson gives a surprising endorsement to the socialist (or Treasury?) solution of a carbon tax, which most politicians and statesmen such as Mr Blair and Senator Bingaman regard as a step too far. The only exception is the environmentally committed government of British

Columbia. We shall see.

In rejecting the need for urgent action on mitigation, he insists that the immediate priority should be to invest in adaptation measures in developing countries where natural hazards and concentrations of populations lead to enormous loss of life, even in the present climate. In the opinion of legislators from developed and developing countries when they met recently to put their case to the G8 and other world leaders, adaptation is vital. But as they observe the growing impacts of climate change in their countries, they are convinced that mitigation is also essential.

The final chapter on bold 'geo-engineering' solutions to reduce global warming and its effects takes a cautious view; but some local projects may be an essential policy tool for example by stimulating the hydrological cycle in desert/mountain areas.

Perhaps the most provocative aspect of the book is the title which implies that better science and policy only needs a better level of the economics-style of reasoning. This is too modest – we need more boldness, openness, inventiveness, humanity, sensitivity, investment and also reasoning, provided it is applied with some humility and with some understanding of its differing cultural overtones.

Lord Hunt of Chesterton
Professor of Climate Modelling, University College
London

LETTER TO THE EDITOR

Dear Sir,

As the Foreign and Commonwealth Office finalises the transfer of the Science and Innovation Network (SIN) to DIUS whilst continuing to invest heavily in climate change programmes, it is becoming increasingly evident here in Brazil that such climate change objectives cannot be achieved without a sound, science-based foreign policy and a clear strategy on international research collaboration. Indeed, scientific collaboration is at the heart of what the Brazilians regard as their strategy for engaging the UK in discussions on climate change: from agreements to launch joint satellites (including Amazonia 1, a deforestation monitoring satellite currently being designed by both countries) to discussions on joint data analysis and meteorological modelling, excellence in science constitutes an essential part of what Brazil wants out of a partnership with the UK. In this context SIN was in an ideal position to shape international research collaboration on the basis of specific foreign policy objectives, which was essential given the influence that UK science exerts on external stakeholders. We can only hope that the appointment of a Chief Scientific Advisor within the Department repairs some of the damage that may have been caused by the transfer of such a vital tool for foreign policy-making.

Yours sincerely,
Damian Popolo
Vice-Consul, Science and Innovation
British Consulate General, Sao Paulo (Brazil)