



## The Politicised Science of Climate Change

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A COUPLE OF YEARS ago I was at a meeting organised by some of the movers and shakers of Australian science and technology who had invited various experts on greenhouse global warming to talk about the most recent report of the Intergovernmental Panel on Climate Change (IPCC). The IPCC is a body of international bureaucrats and scientists which, among other things, produces a report every four or five years on the science of global warming. The reports are enormously influential. They form the platform for much of the world's activism on the greenhouse issue.

The experts at the meeting discussed in particular a new proxy record of the world's temperature over the last 1000 years. The record was given prominent treatment by the IPCC, and was perhaps the most talked-about aspect of its report. It was based mainly on the analysis of tree rings at a number of sites in the northern hemisphere. It became famously known as the "hockey stick". This was because the rise in measured temperature over the last 100 years seemed, by comparison with the proxy record, to be much greater than any changes over the previous 900 years. The graph looked to have the shape of a hockey stick lying down with its blade turned up at the end. Here (at last?) seemed to be good experimental evidence that the world is rapidly warming as a result of man's profligate use of fossil fuel.

But the hockey-stick analysis has problems. One of them concerns the matching of the instrumental record of the last 100 years with the proxy record of the previous 900. Changing an instrument in the middle of a series of measurements is always a dubious procedure, and is infinitely more so when the change corresponds exactly with an apparent change in the quantity being measured.

Then again, it is extraordinarily difficult to detect the rise in global temperature over the last 100 years, even though there have been continuous measurements during that time by many thousands of calibrated thermometers all around the world. Scientists and statisticians are still arguing about it. How much more questionable must be a 900-year record based on measurements at only a very few places--much less than a dozen for a lot of the time. And tree rings are scarcely calibrated thermometers. While

ring thickness may be governed by temperature in a rough sort of way, it is also influenced by lots of other things such as rainfall, disease and local topography.

It seemed reasonable at the meeting to point out some of these problems, and to suggest that perhaps the IPCC had gone a little overboard in its reporting of the matter.

It was like stirring a hornet's nest. One after another the global warming experts rose to condemn me for questioning in public the conclusions of an IPCC report which had been compiled and endorsed as the consensus opinion of a large number of knowledgeable scientists. What right had I to make negative comments when I was not an expert in that particular aspect of climate science? If I wanted to question the science then the proper procedure was to write my thoughts in a formal scientific paper which could be subjected to peer review. And so on and so forth. The verbal spat was quite out of proportion to whatever crime I had committed. Through it all the bemused audience sat quietly. Lord knows what they thought about it all. The condemnation continued for some days afterwards with a rash of fairly rude e-mails demanding that I apologise for bringing disrepute to the IPCC process and to the scientific personnel associated with it.

All of which is fairly petty stuff. It would not normally be worth repotting except that it is a small example of how difficult it can be these days for the ordinary scientist to question the official beliefs of the apparatchiks of global warming. The IPCC was always going to be a lobby mechanism for a particular view of the climate change issue, so it is not surprising that it has become a little messianic and tends to ignore contrary opinion. Certainly its behaviour argues a belief in the old adage that the end justifies the means. But its most remarkable achievement is that it has introduced a sort of religious supportive fervour into the behaviour of many of the scientists directly involved in its activity.

A colleague of mine put it rather well. The IPCC, he said, has developed a highly successful immune system. Its climate scientists have become the equivalent of white blood cells which rush in overwhelming numbers to repel infection by ideas and results which do not support the basic thesis that global warming is perhaps the greatest of the modern threats to mankind.

How has this strange situation come about? More to the point, how is it that the rest of the scientific community, uncomfortable as it is with both the science of global warming and the way its politics is played, continues to let the reputation of science in general be put at considerable risk because of the way the issue is being handled?

It turns out that the hockey-stick reconstruction of past climate is fairly close to being nonsense, and for a reason quite different from any of those mentioned above. A couple of Canadian statisticians found recently that there had been all sorts of errors and omissions in the purely mechanical process of information assembly. When the analysis is done properly, the data in fact suggest that the fifteenth century was much warmer than today--a conclusion which sits rather badly with fashionable doomsday scenarios of future climate change. Not, it should be emphasised, that even the revised picture should be taken too seriously. The basic measurements still have a lot of problems.

## A LITTLE HISTORY

RESEARCH ON CLIMATE became a formal international program in the early 1970s. It was, and still is, based on a network of committees to whose meetings the climate scientists of the world flock like homing pigeons every northern summer. It grew out of an earlier, highly successful, program of the World Meteorological Organisation designed to establish how far ahead one might be able to make detailed predictions of the weather. (The answer to that particular question turned out to be about ten days.)

The new program lacked some of the characteristics of the old. It lacked focus on a specific problem, so progress was hard to define or measure. It lacked an experimental centrepiece to which people could point with pride and say that things were indeed moving. And to some degree it lacked the powerful

personalities who had the clout to keep things on course by virtue of their status within their home research organisations. Scientists, while maintaining their public disdain of activities that "kept them away from their real work", just loved it. The vast array of international meetings ensured that they could be numbered among the most travelled people on Earth.

It soon became apparent that the problem of short-term climate forecasting--that is to say, predicting the average sort of weather over the next year or two--might be inherently insoluble. It was therefore a little dangerous to build an expensive and well-publicised international research program about it. On the other hand it did seem that it might be possible to forecast the very broadest aspects of climate many decades and centuries ahead. Intuition that this was so had enabled scientists 100 years earlier to suggest that global warming might result from increasing concentrations of atmospheric carbon dioxide. It was this very long-term issue which finally emerged as the main public face of what was by then the World Climate Program of the United Nations.

The predictions up to that time (the early 1980s) were of a rise in temperature of a degree or so over the next 100 or 200 years. Such numbers didn't sound horrific to the man in the street; he was a fairly practical chap with bigger problems on his mind. So during the eighties and early nineties there began an almost subconscious search for reasons why the rise in global temperature might be much greater than a degree, and why the change might occur in less than 100 years. The search was strongly linked to the rapid development of computers and computer modelling, which in principle provided for the first time tools to simulate the vast number of complicated processes which determine Earth's climate.

It needs to be understood that any reasonable simulation even of present climate requires computer models to be tuned. They contain parameters (that is, pieces of input information) whose numerical values are selected primarily to give the right answer about today's climate rather than because of some actual measurement. This was particularly so in the mid-eighties. The problem with tuning is that it makes any prediction of conditions different from those of the present far less believable. Even today the disease of "tunable parameters" is still rampant in climate models, although fairly well hidden and not much spoken of in polite society. The scientifically-inclined reader might try sometime asking a climate researcher just how many such parameters there are in his or her latest model. The reader will find there are apparently lots of reasons why such a question is ridiculous, or if not ridiculous then irrelevant, and if not irrelevant then unimportant. Certainly the enquirer will come away having been made to feel foolish.

Different modellers developed their own ways of simulating the processes determining climate, and used as well their own values of tuneable parameters. Thus emerged a highly satisfying spread of the forecasts of the likely rise of Earth's temperature over the next 100 years. Some were as high as six or seven degrees, which is almost as large as the rise in temperature when the world came out of the last ice age. And while other scientists might have had an intuitive feeling that such forecasts were excessive, there was (and for that matter still is) no way to prove that such forecasts are wrong. The complexity of the models is so great that it is extremely difficult, even for other climate modellers, to establish exactly why one model should give a vastly different answer to another--let alone establish which is more likely to be correct.

So the habit arose of quoting the range of the different forecasts without any discussion of the merits of one versus another. Some researchers were uncomfortable about it, but soothed their consciences by insisting that the various results were only "scenarios for scientific study" rather than actual forecasts. This insistence was more than a little naive (or perhaps more than a little cunning) since the distinction went over the head of the general public. It was of course the extreme scenarios which got into the folklore of public opinion.

At the same time there began a fair amount of research on the sensitivity to climate change of this or that biological ecosystem and of this or that human activity. Again the uncertainty of the science helped when trying to build a case for action. "So and so's research indicates that even a small rise in temperature might be disastrous to the yellow-bellied sap-sucker of the upper Zambesi. It is true that the research concerned only one sap-sucker which died in an artificial hothouse, and more work needs to be done, but

can we afford to ignore the result?" Or words to that effect. Suffice it to say that there arose enough semi-scientific myth and legend about the possible detrimental effects of small climate changes that it was easy to contemplate doomsday in the face of somebody's mooted six-or-seven-degree rise in global temperature.

The old adage that bad data is worse than no data was largely forgotten.

## THE IPCC

THUS WAS GENERATED enough noise to justify the establishment in the late 1980s of the Intergovernmental Panel on Climate Change. The organisers set up a report-producing mechanism which involved three separate international working groups. The first dealt with the science behind the predictions of global warming, the second looked at the potential impacts of the warming on society, and the third examined the various possibilities for political and social response.

From the outset it was clear that only the third group was significant, which was why the USA made such a fuss to ensure that its first chairman was an American. They realised that the whole IPCC process could easily be turned into a cudgel with which to beat the West in general and the USA in particular. An American colleague told me in 1990 that the developing countries were quite up-front about the matter. "You Westerners," he reported them saying at one of the early IPCC meetings, "have been exploiting us for hundreds of years, and here finally is an opportunity to redress the balance. Give us all your money!" One assumes he was laying it on a bit thick, but recent history and the development of the Kyoto Protocol suggest that there was a modicum of truth to his version.

In any event, there was no pretence by the response strategy people (the politicians and international negotiators of working group three) of waiting for the outcome of the deliberations of the other two groups before making their recommendations. There was no need. All they really had to know was that the other two working groups would not come out with a categorical statement to the effect that greenhouse warming is a load of nonsense. Even if the research pointed strongly towards the load-of-nonsense theory (which it didn't and doesn't), no scientist worth his or her salt would make a categorical denial of at least the possibility of greenhouse climate change.

The main reason for the existence of the first two working groups was--and still is--to lend gravitas and respectability to the essentially political deliberations of the third.

Revamped IPCC scientific reports have appeared with much fanfare every few years since 1991. Each of them is accompanied by a "Summary for Policy Makers" which is the only thing read by 99.9 per cent of those concerned with the matter. It is the real determinant of public and political opinion on the greenhouse issue. It is also that part of the report whose wording is more-or-less beyond the direct influence of the average scientist.

Each of the successive summaries has been phrased in such a way as to appear a little more certain than the last that greenhouse warming is a potential disaster for mankind. The increasing verbal certainty does not derive from any advances in the science. Rather, it is a function of how strongly a statement about global warming can be put without inviting a significant backlash from the general scientific community. Over the years, the opinion of that community has been manipulated into more-or-less passive support by a deliberate campaign to isolate--and indeed to denigrate--the scientific sceptics outside the central activity of the IPCC. The audience has been actively conditioned into being receptive. It has thereby become gradually easier to sell the proposition of greenhouse disaster.

The conditioning process plays largely on the belief that, because the IPCC is an international body responsible to lots of national governments, and because it is serviced and constrained by many supposedly apolitical scientists, it is somehow free from the biases of industry or political correctness. That belief (at least with regard to political correctness) is naive. Most of the developed countries have

institutionalised their greenhouse activity within government agencies devoted specifically to mitigation of global warming. Their budgets are enormous. It is not likely that the public servants who staff them will be receptive to doubts about their reason for existence. Nor, for that matter, are the actual research institutions concerned with global warming likely to bite the hands that nowadays feed them.

The conditioning process also involves spreading the belief that IPCC announcements are the consensus opinion of the vast majority of knowledgeable climate scientists. The belief is simply not true--at least not in the sense that the public understands it.

It is true that there are a fair number of scientists involved with the IPCC reporting process. This is a necessity because the study of climate involves a great number of specialised and mostly unrelated disciplines, and each discipline needs to be represented. On the other hand there are very few, if any, overall experts on the subject. It is far too broad. So the consensus is not really about the science of the matter, because the individual specialist knows nothing (or nothing much) about most of it. Rather, and to the extent that consensus exists at all, it is simply a public expression of faith in the profession. It is a public expression of the hope that there is somebody else within the system who is knowledgeable enough to pick up any major errors of fact or philosophy.

In any event, climate scientists are far too diffuse a group to mount a coherent disagreement. Whatever their private worries about the overall conclusions, they won't publicly disagree with them provided the wording stays within the bounds of the pre-conditioning.

WRY IS IT SO?

THE INCREASING shrillness of the message about global warming has about it a messianic flavour usually associated with religious faith rather than actual knowledge. And when one looks below the surface of the science, faith is certainly required if one is to go along with the doomsday predictions which have been sold to the public.

First let it be said that even "back-of-the-envelope" calculations (much more believable in many ways than large computer models) suggest that there will indeed be some degree of global warming because of increasing greenhouse gases in the atmosphere. So there is not much argument from scientists about the actual existence of the phenomenon. On the other hand there is very great scepticism--despite contentions to the contrary by the IPCC and the institutions related to it--that the amount of the warming will be enough to worry about, or even enough to notice, bearing in mind the natural variability of both climate itself and the ecosystems on which it bears.

What worries most scientists who know a little about the subject is that virtually the entire experimental support for the theory of global warming is based on the rough coincidence of the slight rise in Earth's temperature over the last 100 years with the rise in concentration of atmospheric carbon dioxide during the same period. The coincidence needs to be viewed in the light of the fact that the world's temperature has always gone up and down like a yo-yo on all sorts of time scales. Presumably it will continue to do so.

This is why the "hockey stick" reconstruction of past temperatures became so famous so fast. It seemed to show that temperature didn't change much for 900 years, so the rise over the last 100 years must be something out of the ordinary. Since this is what scientists wanted to hear, the statisticians who pointed out the problems with the data had to go to enormous lengths to report their results and cover their backs. The wrath of the greenhouse community can be dreadful. And indeed the white blood cells of the IPCC are still gathering, and it is a moot point whether the problems with the hockey stick will ever be admitted. One suspects that, at best, they will simply be ignored. Already around the traps one hears, "Oh yes--the original authors of the hockey stick business were probably a bit sloppy with their data, but it doesn't really matter to the overall greenhouse issue." Perhaps it shouldn't matter, except that the IPCC made such a big deal of the results at the time.

The case for climate change is not made any more acceptable to the non-committed general scientist when virtually any long-term change of an ecosystem is attributed more-or-less automatically to global warming. It is the easiest way to "explain" an observation of (say) a decline in population of a species, and has the additional advantage of being more likely to grab the headlines. It is much easier to blame climate change than to put the observation into the context of an ecosystem which has evolved to be naturally variable--even turbulent--and in which the populations of individual species fluctuate naturally as a survival mechanism.

Even after a quarter-century of hard work, the numerical models tell a coherent story about the possible change of climate in only one respect--namely, that the global average surface temperature is likely to go up. But we knew that more than 100 years ago. When it comes to prediction of more detailed information like the distribution of temperature and of rainfall, individual models tell entirely different stories. One model might suggest that Australia will become dryer. Another might suggest that it will become wetter. A third will calculate no change. Needless to say, in a country not over-endowed with water, it is the "dryer Australia" scenario which hits the headlines or makes it into the scientific literature, even though actual measurements over the last 100 years seem to indicate otherwise.

Most scientists--certainly most physicists and mathematicians--strongly distrust large-scale numerical models which rely heavily on tuneable parameters and other artificial constraints to keep them from going haywire. They particularly distrust the output of models whose predictions cannot, for lack of sufficiently detailed data, be tested against real events of the past.

So one suspects that a fair amount of the shrillness of the climate message derives from a fear that something will happen to prick the scientific balloon so carefully inflated and overstretched over the last few decades.

The IPCC doesn't really need to worry. The difficulty for the sceptics is that credible argument against accepted wisdom requires, as did the development of the accepted wisdom itself, large-scale resources which can only be supplied by the research institutions. Without those resources, the sceptic is only an amateur who can easily be kept in outer darkness.

It is this need for massive resources before engaging in argument about the good or bad of climate research that takes the whole business outside the realm of acceptable science. It means in practice that the checks and balances usually associated with science simply can't operate. Perhaps there is much to the suggestion by the scientifically-literate author Michael Crichton in a recent lecture:

*Sooner or later, we must form an independent research institute in this country. It must be funded by industry, by government, and by private philanthropy, both individuals and trusts. The money must be pooled, so that investigators do not know who is paying them. The institute must fund more than one team to do research in a particular area, and the verification of results will be a foregone requirement: teams will know their results will be checked by other groups. In many cases, those who decide how to gather the data will not gather it, and those who gather the data will not analyse it. If we were to address the land temperature records with such rigor, we would be well on our way to an understanding of exactly how much faith we can place in global warming, and therefore with what seriousness we must address this.*

## IDEALISM WILL OUT

THE TYPICAL SCIENTIST is perhaps rather more idealistic than most people. His trouble is that his profession rarely provides an outlet either for idealism or for its associated activity of political activism. Research after all is supposed to be disinterested. The climate-change issue, the daddy of all environmental problems, seems to have provided an opportunity for researchers to have their cake and eat it too.

On the one hand, the study of climate is inherently worthwhile--in the strictly selfish sense that the scientific problem is real (lots of research these days doesn't have that advantage), it is popular with the public, and it is relatively well funded. On the other, it provides a direct link to grand-scale social activism and to the feeling of being part of a cause. This last is extremely attractive. Most climate scientists, presumably in common with many environmentalists, believe there are vast numbers of well-funded and well-organised anti-greenhouse people out there. These are assumed to be unconscious dupes of nasty multinational energy companies who are devoting enormous resources to manipulating public or political opinion. How good it is to be one of a small coterie of dedicated knights, each on a white horse and each armed with the lance of science, fighting heroically to save the future of the world against overwhelming forces of evil.

The balance of power is not quite as they imagine. "The IPCC process" and the political machinations surrounding the Kyoto Protocol have spawned large government bureaucracies in most of the major industrialised nations, the staff of which are, reasonably enough, devoted to the global warming cause. The Australian Greenhouse Office is a typical example. Add the research institutions and university scientists who feed off these bureaucracies, and support for them all by the environmental movement. Industry in Australia, or at least that industry which has a natural interest in the politics of climate change, may field perhaps half a dozen people whose part-time brief is to keep abreast of what is going on. The balance is very definitely on the side of the "goodies".

But it is difficult so to convince the idealistic climate scientist.

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