

Book reviews

Climate Change – Turning up the Heat by Barrie Pittock (CSIRO Publishing, 2005). ISBN 1844073009, 272 pp., \$39.95.

Barrie Pittock will be well known to readers of the *Australian Meteorological Magazine*. A doyen of climate science in Australia, Pittock's contribution over many decades in terms of science and science leadership has been well recognised at all levels. Thus a new major book on climate change from Pittock is noteworthy and deserving of significant attention given that it is based on as extensive a career and as wide and deep a perspective as exists in this field.

Climate Change – Turning up the Heat is a broad and comprehensive book. The book is about the enhanced greenhouse effect primarily – other causes of climate change are understandably relegated to relatively brief comment. For a greenhouse text, the book covers in depth all the topics one might expect: science, impacts, adaptation, mitigation and the political environment. Somewhat surprisingly, the text becomes increasingly comprehensive on the later topics with as much text being invested on 'mitigation' as on 'science' and close to twice as much text on the politics of greenhouse as on the science. In this sense, Pittock's book diverges importantly from its main competitor (John Houghton's *Global Warming – The Complete Briefing*). While Houghton invests more than 100 pages on the science to establish that a problem exists, Pittock focuses more on the consequences of the problem and what we might do about it. This strongly reflects the nature of greenhouse – that the science is now well established and the problems lie in how to deal with the impacts in an environment of scientific uncertainty and political frameworks that appear slow to move.

In terms of the science of greenhouse, Pittock's book struggles a little due to the massive amount of information available. It basically uses the standard science of Working Group 1 of the Intergovernmental Panel on Climate Change (IPCC, specifically the Third Assessment Report) and interleaves commentaries and locally based analyses to bring the dry-text of the IPCC to life. There are many examples of clear destructions of arguments commonly used by greenhouse sceptics. Examples include commentaries on the 'hockey stick', why projections of (say) 1°C of warming could still be regionally disastrous (using Europe as an example), and why some geologists – who insist on writing in the

popular press that greenhouse has all happened before and can be ignored – need to update their understanding of climate and time-scales of climate responses. Some of the arguments presented by Pittock were new to me and have been usefully added to my personal response list to those frequently asked questions that we all receive. In terms of the science there seemed to me to be some oddities. The 20 pages on 'learning from the past' seems imbalanced with the six pages on climate modelling (Houghton invested nearly 40 pages) but it is not hard to merely pick up the alternative texts when required.

For me, Pittock's book began to really take shape when he used his extensive experience to refocus his approach towards risk and vulnerability. Chapter 4 ('Uncertainty is inevitable, but risk is certain') was refreshing and provided a good foundation for Chapter 6 ('Impacts: Why be concerned?') and subsequent chapters on adaptation and mitigation. These in turn flowed seamlessly into 'The politics of greenhouse'. These chapters contained a wealth of information that I have not seen so completely covered in a text before; in particular the Australian focus of much of the material contrasts sharply and refreshingly with the usual US/Europe perspectives. There will surely be a considerable amount of criticism of some of Pittock's analysis and conclusions – they become pointed at those responsible for apparent inaction. His rebuttal of the arguments commonly reported against Kyoto clearly establish Pittock's personal view point. He presents counter-arguments in support of Kyoto but does not do this in a balanced way. He does not comment, for example, on the arguments used in support of Australia's refusal to sign. He presents many ways of mitigating greenhouse – many of which offer effective measures to reduce our greenhouse fingerprint. While there tends to be a little glossing over some of the negative consequences of a few of these measures, Pittock's presentation of the alternatives and options is as complete as I have seen in the Australian context.

My main concern for this book is: who should read it? It is not an undergraduate text – certainly not as a set text, although key chapters would be ideal for senior undergraduates. It is not an easy read because the narrative is too disjointed to hold most modern undergraduates' attention. Personally, I think a substantial fraction of the most important text is pitched at a level too demanding of the 'educated layman'. It is not the individual sentences that are hard, it is the information richness of the text that makes reading challeng-

ing. The density of the narrative is very high and I found myself reading many sections several times and gaining new information each time. This makes it a good investment for the professional reader but I doubt lay readers or undergraduates would invest the time required.

Thus, *Climate Change – Turning up the Heat* offers a personal view of the science, impacts and adaptation strategies of greenhouse. Given Pittock's contribution to greenhouse nationally and internationally we should take the suggestions he offers seriously. We should bring these perspectives into our own consciousness to test our own views and prejudices against. We would all gain a little wisdom from adding aspects of Pittock's perspective to our own. Thus, professional meteorologists, environmentalists, climate change scientists, planners and policy developers should read this book because they will benefit from Pittock's insight and they will develop a broader perspective on one of the key challenges in the 21st century. I therefore strongly recommend this book to this group of professional readers. Of course, the group that should read the book most carefully, objectively and with an open mind, are those sceptics that continue to use arguments raised in the early 1990s that have since been rebuffed by committed scientists such as Pittock. This book offers them a timely challenge to update their arguments based on the latest science . . . if they can.

Andy Pitman

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The Weather Makers by Tim Flannery
(Text Publishing, Australia, 2005).
ISBN 1920885846, 384 pp., \$32.95.

Director of the South Australian Museum, environmental scientist and award-winning author, Tim Flannery, has written a well-researched and entertaining book on climate change.

Five years ago, Flannery was a greenhouse sceptic, maintaining that global warming was 'just a trivial issue'. More important, he said, were threats such as biodiversity loss, destruction of the rainforests, pollution of the oceans, and overpopulation. Today, with

the fervour of a convert, he maintains that these threats are 'waves on the ocean compared with the tsunami that is coming behind them that we know as global warming'.

Flannery writes passionately and evocatively. The book starts with an ode to Gaia, the notion that our planet acts as a super-organism with the ability to regulate environmental conditions needed to sustain itself. Richly described material follows on the nature and behaviour of the atmosphere and the oceans. There is much historical information, primarily examining climatic cycles, with descriptions of ice-core and tree-ring records offering windows into the past.

The Weather Makers details 'magic gates' through which the climate is said to move, resulting in fundamental worldwide shifts from one stable state to another. Manifestations include sea-surface temperature jumps or ocean salinity declines. According to the author, two of the climate shifts have occurred during the past decades.

Potential future collapse of the Gulf Stream, destruction of the Amazon rainforests, and methane release from the sea floor are described as potential future climatic 'tipping points'.

There are detailed descriptions of species shifts and 'runaway' impacts of global warming at the poles. Coral reefs earn a chapter, as do declining toads. There is much information on the rainfall declines experienced in southwestern Western Australia and southeastern Australia – both attributed, at least in part, to climate change.

Flannery asserts that a global temperature increase of a single degree will 'decide the fate of hundreds of thousands of species, and most probably billions of people'. He is critical of Australia's refusal to ratify the Kyoto Protocol, as an aside noting that Australian stock traders are 'missing out on an estimated \$150 million per year because carbon credits are not being traded on Australian trading floors'. Flannery says that there has been no careful analysis of the costs of ratification versus non-ratification of Kyoto.

There are chapters on mitigation approaches and technologies. The author staunchly advocates development and use of renewable fuels in order to reduce emissions of greenhouse gases.

Quotable quotes are a feature of the book. For example, in a reference to how rapidly we consume plant matter and fossil fuels, 'Over each year of our industrial age, humans have required several centuries' worth of ancient sunlight to keep the economy going'.

There is much of value in the book. However, there are a number of problematic assertions. *The Weather Makers* says, for example, that climate researchers established the Intergovernmental Panel

on Climate Change. It was set up by governments. The 1997-98 El Niño is cast as a 'magic gate', permanently altering climate. Many would disagree.

Flannery says that the most sophisticated climate models are at the Hadley Centre in Britain, the Lawrence Livermore National Laboratory in the US and at the German Max Planck Institute for Meteorology. He provides no justification for this debatable view. Researchers are likely to take exception to the statement that a 'widely accepted view places the limit (of dangerous climate change) at around 2°C of warming'. Many will also quibble with 'warming rates above 0.1°C per decade are likely to rapidly increase the rate of significant ecosystem damage'.

Something is amiss with the references, which are presented neither sequentially nor alphabetically. The first cited reference, for example, is number 116. Worse, some of the references are incorrect.

Overall, Tim Flannery has prepared an eminently readable, persuasive and very personal call to arms. In places he glosses over uncertainties to make a point. However, *The Weather Makers* neatly brings together a diverse range of the latest findings in a book that will serve as a useful reference that will be influential for years.

Paul Holper

Paul Holper is Executive Officer of CSIRO CLIMATE. He has many years' experience communicating and coordinating greenhouse science activities and has more than a dozen books to his name.