

**FOUR DEGREES OF GLOBAL WARMING: Australia in a Hot World.** Edited by Peter Christoff. London; New York: Routledge, 2013. xviii, 268 pp. (Figures, tables.) US\$150.00, paper. ISBN 978-0-415-82457-6.

Writing this review in June 2015 feels a little eerie, as Australia is currently receiving a drubbing from other nations at the Bonn Climate Change Conference for its recalcitrance. Kofi Annan last week called it a “free rider,” and Angela Merkel is pushing hard for commitment to a carbon-free international economy by 2100, while Australia continues to issue mining licenses for ever more open-cut coalmines and natural gas fracking projects.

But only a few short years ago Australia was seen as a courageous trailblazer, introducing a carbon price mechanism and subsidizing the development of sustainable energy resources. What has happened? A change of federal and some state governments has seen a major ideological shift that has reversed these approaches, with the reversal proudly claimed as a victory. Which emphasizes that the future of the planet is too important to leave in the hands of politicians, who are driven primarily by their perception of electoral advantage, and hardly, if at all, by ecological concerns.

The many scientists who authored this seminal book examine the profound social, ecological, and economic implications a hotter world will have for Australia. The introduction explains what “four degrees” means. It comes, indirectly, from the UN Climate Conference held in Copenhagen in December 2009. Though international politics overwhelmingly triumphed over science there also, it was finally agreed to set a non-binding limit on global warming of 2°C *above pre-industrial levels* (my emphasis). This was what scientists agreed was “the highest level that could be endured before the risks of dangerous climatic change, including abrupt and catastrophic climate shifts, became too high” (4). The 2°C figure has consistently been misunderstood, and misquoted by the media to imply that it is 2°C above current levels. Since global temperature had already risen 0.8°C above pre-industrial levels when this book was being written a couple of years ago, what they should actually be talking of is at most 1°C from current levels. Worse, the book points out that 2°C was always a wistful dream, as the “aggregate reduction pledged [by the signatories at Copenhagen] would make achieving the ... global reductions necessary to keep below 2°C impossible” (5). Current global trajectories predict an actual 4°C increase over pre-industrial levels by or even before 2100. It already seems so inevitable as to become the de facto goal—and we are already a quarter of the way there.

The book is divided into 14 chapters: an introduction, four parts, and conclusion. The introduction and part 1 provide global historical context, survey Australia's climate since records began, and foreshadow what may be expected in a "4° world." Already evident terrestrial effects of warming are changes in extreme weather events, with severe flooding, record high temperatures, and frequency of wildfires, all shown to have increased significantly over the past decade.

Part 2 deals with ecological impacts, with chapters on terrestrial biodiversity, marine resources, and agricultural impacts. I found the second of these ("Australia's marine resources in a warm, acid ocean") perhaps the most unsettling chapter in the book, especially given that Australia has sovereign rights over a marine area of 16 million km<sup>2</sup>—almost twice its land area (84). Here, as on land, the impact of global warming is cumulative with other human impacts (fertilizers draining into the sea, mangrove clearing, etc.). The authors conclude that "[t]here is little evidence to suggest that marine resources are robust enough to resist current and projected climate-change driven environmental changes...[and] effective adaptation to these challenges is likely to be impossible given how extensive, and how expensive, the required interventions would most likely have to be" (96).

Part 3 concerns social and economic impacts. It looks at the limits to human adaptation, health impacts, and planning for urban impacts. Most disturbing here is chapter 11, "No island is an island: security in a four degree world." We are already seeing unprecedented population movement globally because of war and poverty. When that is exacerbated by coastal storm surges and inundation, food and water shortages, disease, and the depletion or destruction of support ecosystems, the human misery and security issues can hardly be imagined.

Part 4 is optimistically called "Adaptation," but the key chapter (chapter 13), "Can we successfully adapt to four degrees of global warming," admits that "we do not yet know if we can ... (be) successful" (216). Three storylines developed to try and visualize living in a world with a changed climate, would require altruistic political and social evolution to occur in a manner and at a pace that is nowhere indicated in Australia today.

Similarly, the conclusion sets out a range of principles and guidelines that it perfectly reasonably argues must be a "wake-up call to Australia's policy-makers." Sadly, virtually none of the evidence to date from Australia's political leadership suggests that they would take the trouble to read this book, or that if they did, they would have the wit or the will to heed its messages or follow its suggestions. The editor warns that "whether we like it or not, things will change ... The positive outcomes of

exemplary action are never certain, but they are a vast improvement on the consequences of a powerful nation acting as a laggard” (255). Kofi Annan, and many others in the world today, clearly see Australia as that laggard.

Inevitably in a careful analysis such as this, most chapters are heavy on statistical data, charts, and tables that are difficult for the lay reader to fully understand. However, every chapter is written in pleasingly accessible language, spells out simply the analysis of the data, and has a conclusion. So it is perfectly possible for an intelligent lay reader to get a great deal from this book—as it turns out, probably a lot more than they would prefer, given the bleak message it contains. If only our politicians would read it!

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